

638824

**Report Number: 214-TRC-06-009**

**Safety Compliance Testing For FMVSS 214**

**Side Impact Protection**

**Kia Motors Corp.  
2007 Kia Rio 4-door**

**NHTSA Number: C70509**

**Transportation Research Center Inc.**

**10820 State Route 347**

**P. O. Box B-67**

**East Liberty, OH 43319**



**Test Date: March 23, 2007**

**Final Report: April 5, 2007**

**U. S. Department Of Transportation  
National Highway Traffic Safety Administration**

**Enforcement**

**Office of Vehicle Safety Compliance**

**400 Seventh Street, S. W.**

**Room No. 6111 (NVS-220)**

**Washington, DC 20590**

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-02-D-11114. This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings, and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Test Performed By: William Millis, Engineering Technician

Report Approved By: \_\_\_\_\_

Walter Dudek, Project Manager

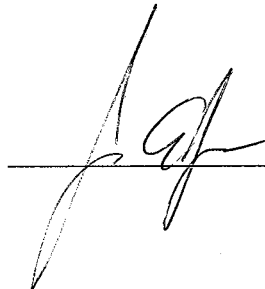
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Approval Date: \_\_\_\_\_

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Acceptance Date: \_\_\_\_\_

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| 1. Report No.<br>214-TRC-06-009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2. Government Accession No.                                | 3. Recipient's Catalog No.                                                                                                                                                                                                                              |                 |     |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
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| 4. Title and Subtitle<br>Final Report of FMVSS 214 Compliance Side Impact Testing of a 2007 Kia Rio 4-door, NHTSA No.: C70509                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                            | 5. Report Date<br>April 5, 2007                                                                                                                                                                                                                         |                 |     |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
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| 7. Author(s)<br>Walter Dudek, Project Manager<br>Transportation Research Center Inc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            | 8. Performing Organization Report No.<br><br>070323                                                                                                                                                                                                     |                 |     |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
| 9. Performing Organization Name and Address<br>Transportation Research Center Inc.<br>10820 State Route 347<br>East Liberty, OH 43319                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                            | 10. Work Unit No. (TRAIS)                                                                                                                                                                                                                               |                 |     |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
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| 15. Supplemental Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                            |                                                                                                                                                                                                                                                         |                 |     |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
| 16. Abstract<br><p>This 48/24 km/h 90° Impact (Moving Deformable Barrier) Compliance Test was conducted on the subject vehicle, a 2007 Kia Rio 4-door in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-214D-06 to determine FMVSS 214 Side Impact Protection compliance. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on March 23, 2007.</p> <p>The impact velocity of the Moving Deformable Barrier (MDB) was 52.9 km/h, and the ambient temperature at the struck (passenger) side of the target vehicle at the time of impact was 24° C. The target vehicle's post-test maximum crush was 253 mm at Level 2.</p> <p>The test or target vehicle's performance is given below (with FIR filter):</p> <table border="0"> <thead> <tr> <th></th> <th><u>Front SID</u></th> <th></th> <th><u>Rear SID</u></th> <th></th> </tr> </thead> <tbody> <tr> <td>Right Upper Rib Acceleration:</td> <td><u>30.0</u></td> <td>g's</td> <td><u>72.2</u></td> <td>g's</td> </tr> <tr> <td>Right Lower Rib Acceleration:</td> <td><u>31.1</u></td> <td>g's</td> <td><u>69.5</u></td> <td>g's</td> </tr> <tr> <td>Lower Spine Acceleration:</td> <td><u>47.3</u></td> <td>g's</td> <td><u>57.2</u></td> <td>g's</td> </tr> <tr> <td>Thoracic Trauma Index, (TTI):</td> <td><u>39.2</u></td> <td>g's</td> <td><u>64.7</u></td> <td>g's</td> </tr> <tr> <td>Pelvis Acceleration (PEV):</td> <td><u>59.8</u></td> <td>g's</td> <td><u>59.6</u></td> <td>g's</td> </tr> </tbody> </table> <p>The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during side impact event.</p> |                                                            |                                                                                                                                                                                                                                                         |                 |     | <u>Front SID</u> |  | <u>Rear SID</u> |  | Right Upper Rib Acceleration: | <u>30.0</u> | g's | <u>72.2</u> | g's | Right Lower Rib Acceleration: | <u>31.1</u> | g's | <u>69.5</u> | g's | Lower Spine Acceleration: | <u>47.3</u> | g's | <u>57.2</u> | g's | Thoracic Trauma Index, (TTI): | <u>39.2</u> | g's | <u>64.7</u> | g's | Pelvis Acceleration (PEV): | <u>59.8</u> | g's | <u>59.6</u> | g's |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <u>Front SID</u>                                           |                                                                                                                                                                                                                                                         | <u>Rear SID</u> |     |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
| Right Upper Rib Acceleration:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <u>30.0</u>                                                | g's                                                                                                                                                                                                                                                     | <u>72.2</u>     | g's |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
| Right Lower Rib Acceleration:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <u>31.1</u>                                                | g's                                                                                                                                                                                                                                                     | <u>69.5</u>     | g's |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
| Lower Spine Acceleration:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <u>47.3</u>                                                | g's                                                                                                                                                                                                                                                     | <u>57.2</u>     | g's |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
| Thoracic Trauma Index, (TTI):                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <u>39.2</u>                                                | g's                                                                                                                                                                                                                                                     | <u>64.7</u>     | g's |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
| Pelvis Acceleration (PEV):                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <u>59.8</u>                                                | g's                                                                                                                                                                                                                                                     | <u>59.6</u>     | g's |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
| 17. Key Words<br>Compliance Testing<br>Side Impact Protection<br>FMVSS 214<br>Side Impact Dummy (SID)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                            | 18. Distribution Statement<br>Copies of this report are available from:<br>NHTSA Technical Information Services (TIS)<br>Room 5108 (NPO-230), 400 Seventh Street, S.W.<br>Washington, DC 20590<br>Telephone No. (202) 366-4946<br>Attn: Robert Hornicle |                 |     |                  |  |                 |  |                               |             |     |             |     |                               |             |     |             |     |                           |             |     |             |     |                               |             |     |             |     |                            |             |     |             |     |
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## Section 1

### Purpose and Test Procedure

This side impact test is part of the FMVSS 214 Side Impact Protection Compliance Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-02-D-11114. The purpose of this test was to evaluate side impact protection in a 2007 Kia Rio 4-door. The test was conducted in accordance with the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-214D-06, dated July 2001).

## Section 2

### Summary of Side Impact Test

A 2007 Kia Rio 4-door was impacted on the right side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 52.9 km/h (32.8 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, Ohio on March 23, 2007. Pre-test and post-test photographs of the test vehicle, the moving deformable barrier (MDB), and the side impact dummies (SIDs) are included in Appendix A.

Two restrained Side Impact Dummies (SIDs) were placed in the right front passenger (Pos. #2) and right rear passenger (Pos. #3) designated seating positions according to the instructions specified in the OVSC Side Impact Laboratory Test Procedure (TP-214D-06, dated July 2001). Both SID dummies were certified prior to this test. The side impact test was documented by one real-time camera and 9 high-speed cameras. Camera locations and other pertinent camera information are included in this report.

The SIDs were instrumented with the following accelerometers:

1. Right Upper Rib (LUR) uniaxial and redundant accelerometer (Y-direction)
2. Right Lower Rib (LLR) uniaxial and redundant accelerometer (Y-direction)
3. Lower Thoracic Spine (T<sub>12</sub>) uniaxial and redundant accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial and redundant accelerometer (Y-direction)

A summary of the side impact dummy (SID) configuration and verification test data can be found in Appendix C. A total of 42 channels of data were recorded. Appendix B contains the vehicle, MDB, and dummy response data traces.

The following tables summarize the results of the test:

| Injury Criteria | Front SID | Rear SID |
|-----------------|-----------|----------|
| TTI (g)         | 39.2      | 64.7     |
| PEV (g)         | 59.8      | 59.6     |

### Data Acquisition Explanations

The vehicle's right lower A-post Y-axis acceleration data channel, 13APILLO0000ACYA, recorded questionable data. The velocity was also affected.

The vehicle's right lower B-post Y-axis acceleration data channel, 16BPILLO0000ACYA, exceeded full-scale at approximately 4 milliseconds and recorded no valid data after that. The velocity was also affected.

## Section 3

### Summary of Test Results

Data Sheet 1

General Test Vehicle Parameter Data

Test Vehicle Information:

Vehicle Year/Make/Model: 2007 Kia Rio  
Vehicle Body Style/Color: 4-door/Silver VIN: KNADE123576188258  
Vehicle NHTSA No.: C70509 Build Date: 10/06  
Engine Data: 4 Cylinders;      CID; 1.6 Liters;      cc  
Placement: X Longitudinal; or - Lateral; or - Horizontal  
Transmission: 5 Speed; X Manual;      Automatic;      Overdrive  
Final Drive: - RWD; X FWD;      Four-Wheel Drive  
Odometer Reading: 66 miles  
Options: - A/C; - Power steering; X Power brakes; - Power windows

Data From Vehicle's Tire Placard:

Tire Pressure (at capacity)<sup>1</sup> 210 kPa Front; 210 kPa Rear  
Recommended Tire Size: P175/70R14  
Tires on Test Vehicle: P175/70R14 Manufacturer: Hankook, Optimo

Vehicle Capacity Data:

Number of Occupants: 2 Front; 3 Rear; 0 3rd seat; 5 Total  
Type of Front Seats: - Bucket; X Bench; - Split bench  
Type of Front Seat Back: - Fixed; X Adjustable with X Lever or - Knob  
Vehicle Max. Capacity Loading = 385 kg (A)  
No. of Occupants x 68.04 kg. = 340 kg (B)  
Vehicle Cargo Capacity (A-B) = 45 kg

Test Vehicle Delivered Weight With Maximum Fluids:

|                         |   |                  |                        |   |                 |
|-------------------------|---|------------------|------------------------|---|-----------------|
| Left Front              | = | <u>344.8</u> kg  | Left Rear              | = | <u>209.6</u> kg |
| Right Front             | = | <u>327.4</u> kg  | Right Rear             | = | <u>211.4</u> kg |
| Total Front             | = | <u>672.2</u> kg  | Total Rear             | = | <u>421.0</u> kg |
| Front % of Total Weight | = | <u>61.5</u> %    | Rear % of Total Weight | = | <u>38.5</u> %   |
| Total Weight            | = | <u>1093.2</u> kg |                        |   |                 |

<sup>1</sup> Tire pressure used in test.

Data Sheet 1 (Continued)

General Test Vehicle Parameter Data

Calculation Of Vehicle's Target Test Weight:

|                                                                 |   |                          |
|-----------------------------------------------------------------|---|--------------------------|
| Total Test Vehicle Delivered Weight With Max. Fluids            | = | <u>1093.2</u> kg (A)     |
| Maximum Cargo Carrying Capacity of Test Vehicle                 | = | <u>45.0</u> kg (B)       |
| Weight of Instrumented Side Impact Dummies (2 X <u>83.0</u> kg) | = | <u>166.0</u> kg (C)      |
| Test Vehicle Target Weight:                                     | = | <u>1304.2</u> kg (A+B+C) |

Fully Loaded Test Vehicle (UDW + 2 SIDs + Cargo):

|                         |   |                  |                        |   |                 |
|-------------------------|---|------------------|------------------------|---|-----------------|
| Left Front              | = | <u>347.2</u> kg  | Left Rear              | = | <u>282.8</u> kg |
| Right Front             | = | <u>382.2</u> kg  | Right Rear             | = | <u>304.4</u> kg |
| Total Front             | = | <u>729.4</u> kg  | Total Rear             | = | <u>587.2</u> kg |
| Front % of Total Weight | = | <u>55.4</u> %    | Rear % of Total Weight | = | <u>44.6</u> %   |
| Total Weight            | = | <u>1316.6</u> kg |                        |   |                 |

As Tested Weight of Test Vehicle (2 SIDs + Cargo):

|                         |   |                  |                        |   |                 |
|-------------------------|---|------------------|------------------------|---|-----------------|
| Left Front              | = | <u>361.8</u> kg  | Left Rear              | = | <u>273.0</u> kg |
| Right Front             | = | <u>371.8</u> kg  | Right Rear             | = | <u>289.4</u> kg |
| Total Front             | = | <u>733.6</u> kg  | Total Rear             | = | <u>562.4</u> kg |
| Front % of Total Weight | = | <u>56.6</u> %    | Rear % of Total Weight | = | <u>43.4</u> %   |
| Total Weight            | = | <u>1296.0</u> kg |                        |   |                 |

Test Vehicle Attitude (all dimensions in millimeters):

| As Delivered           | Fully Loaded           | Ready For Test         |
|------------------------|------------------------|------------------------|
| Right Front <u>655</u> | Right Front <u>638</u> | Right Front <u>638</u> |
| Left Front <u>652</u>  | Left Front <u>645</u>  | Left Front <u>646</u>  |
| Right Rear <u>648</u>  | Right Rear <u>600</u>  | Right Rear <u>608</u>  |
| Left Rear <u>648</u>   | Left Rear <u>608</u>   | Left Rear <u>609</u>   |

Data Sheet 1 (Continued)

General Test Vehicle Parameter Data

Test Vehicle Attitude:

|                       | Left Sill<br>Pitch | Right Sill<br>Pitch | Front Bumper<br>L-R Roll | Rear Bumper<br>L-R Roll |
|-----------------------|--------------------|---------------------|--------------------------|-------------------------|
| As Delivered:         | -0.7°              | -0.9°               | -0.4°                    | 0°                      |
| Fully Loaded:         | 0°                 | -0.4°               | 0.2°                     | 0.4°                    |
| As Tested:            | 0.1°               | 0.2°                | 0.2°                     | 0.2°                    |
| Negative Pitch Angle= | Vehicle front down |                     |                          |                         |
| Negative Roll Angle = | Driver side down   |                     |                          |                         |

Test Vehicle Wheelbase: 2510 mm

C.G. = 1089 mm rearward of front wheel centerline

Total Vehicle Length:

Right Side = 4025 mm

Left Side = 4025 mm

Centerline = 4250 mm

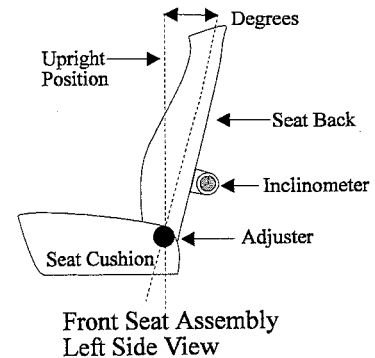
Data Sheet 1 (Continued)

General Test Vehicle Parameter Data

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509

Nominal Design Riding Position for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.



Front Seat Cushion Placement: Detent 12 of 23 detents

Total Length of Fore/Aft Adjustment Travel: N/A mm

Total Number of Adjustment Positions or Detents: 23

Front Seat Back Adjustment Position: 5 detents back from full up

Seat Back Torso Angle: 25 degrees

Second Position Seat Placement: Fixed

Total Length Of Fore/Aft Adjustment Travel: N/A mm

Seat Back Adjustment Position: Fixed

Adjustable Steering Column Position: N/A

Window Positions:

Right Front: Closed

Right Rear: Closed

Left Front: Open

Left Rear: Open

Note: Windows will be in closed position on struck side of test vehicle and in open position on opposite side.

Amount of Stoddard Solvent In Fuel Tank:

45.0 liters (fuel tank usable capacity)

42.0 liters used in test (92% - 94% of fuel tank usable capacity)

Location of Impact Point On Test Vehicle Side To Be Impacted:

Wheelbase = 2510 millimeters

Intended impact point is 315 millimeters rearward of front axle centerline

(which is 940 millimeters forward of the wheelbase midpoint)

Actual Impact Point is 320 millimeters rearward of front axle centerline



## Data Sheet 2

### Test Vehicle Summary of Results

Vehicle Year/Make/Model: 2007/Kia/Rio

Body Style: 4-door

VIN: KNADE123576188258

NHTSA No.: C70509

Build Date: 10/06

Test Date: 03/23/07

Vehicle Overall Length = 4250 mm

Overall Width = 1695 mm

#### Vehicle Test Weight (Pre-Test):

Left Front = 361.8 kg      Left Rear = 273.0 kg

Right Front = 371.8 kg      Right Rear = 289.4 kg

Total Front = 733.6 kg      Total Rear = 562.4 kg

Total Weight = 1296.0 kg

Wheelbase = 2510 mm

Longitudinal C.G. From Center Of Front Axle = 1089 mm

Impact Angle With Respect To Impactor = 90 degrees

#### Impact Point:

Actual Impact Point is 10 mm left of nominal impact ref. line (Lateral)

Actual Impact Point is 8 mm up from nominal impact point (Vertical)

#### Maximum Exterior Static Crush:

1. Level 1 ( 260 mm above ground) = 70 mm

2. Level 2 ( 554 mm above ground) = 253 mm

3. Level 3 ( 665 mm above ground) = 185 mm

4. Level 4 ( 940 mm above ground) = 146 mm

5. Level 5 ( 1444 mm above ground) = 5 mm

Maximum Post-Test Intrusion = 253 mm

#### Occupants:

##### Front Passenger

##### Rear Passenger

Dummy Identification 065

028

Restraints Used 3-pt. seat belt, side curtain  
and torso airbags

3-pt. seat belt and side  
curtain airbag

#### Instrumentation:

Number of Vehicle Data Channels: = 21

Number of Cameras: Onboard = 3      Offboard = 6      Total = 9

Data Sheet 3

Moving Deformable Barrier (MDB) Summary

MDB Face Manufacturer And Serial Number:

Cellbond, GJ320

Position Of Impactor (MDB) On Monorail:

Crabbed 27° to the left

MDB Specifications:

|                                                     |   |             |    |
|-----------------------------------------------------|---|-------------|----|
| Overall Width of Framework Carriage                 | = | <u>1251</u> | mm |
| Overall Length of MDB (Incl. honeycomb impact face) | = | <u>4014</u> | mm |
| Wheelbase of Framework Carriage                     | = | <u>2591</u> | mm |
| Track of Framework Carriage (Front & Rear)          | = | <u>1881</u> | mm |
| C.G. Location Rearward of Front Axle                | = | <u>1110</u> | mm |

MDB Weight:

|                                                                  |   |               |    |            |   |              |    |
|------------------------------------------------------------------|---|---------------|----|------------|---|--------------|----|
| Left Front                                                       | = | <u>376.8</u>  | kg | Left Rear  | = | <u>317.2</u> | kg |
| Right Front                                                      | = | <u>401.4</u>  | kg | Right Rear | = | <u>266</u>   | kg |
| Total Front                                                      | = | <u>778.2</u>  | kg | Total Rear | = | <u>583.2</u> | kg |
| Total MDB Weight                                                 | = | <u>1361.4</u> | kg |            |   |              |    |
| Impact Angle (MDB C/L to Target Vehicle C/L) = <u>90</u> degrees |   |               |    |            |   |              |    |
| Impact Speed = <u>52.9</u> km/h                                  |   |               |    |            |   |              |    |

Maximum Static Crush of Honeycomb Impact Face:

|                                    |   |            |             |
|------------------------------------|---|------------|-------------|
| 1. Row A at Center of Bumper Level | = | <u>91</u>  | millimeters |
| 2. Row B at Top of Bumper Level    | = | <u>45</u>  | millimeters |
| 3. Row C at Mid Level              | = | <u>62</u>  | millimeters |
| 4. Row D at Top of Stack Level     | = | <u>125</u> | millimeters |

Instrumentation:

Number of MDB Data Channels = 7

Data Sheet 4

Post-Test Observations

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509

Visible Dummy Contact Points:

|              | <u>Right Front SID</u>     | <u>Right Rear SID</u>                      |
|--------------|----------------------------|--------------------------------------------|
| Head:        | <u>Side curtain airbag</u> | <u>Side curtain airbag and side header</u> |
| Upper Torso: | <u>Side torso airbag</u>   | <u>Door panel</u>                          |
| Lower Torso: | <u>Side torso airbag</u>   | <u>Door panel</u>                          |
| Left Knee:   | <u>None</u>                | <u>None</u>                                |
| Right Knee:  | <u>Door panel</u>          | <u>Door panel</u>                          |

Door Opening:

|        | <u>Left Side</u> | <u>Right Side</u>         |
|--------|------------------|---------------------------|
| Front: | <u>Easy</u>      | <u>Jammed and latched</u> |
| Rear:  | <u>Easy</u>      | <u>Jammed and latched</u> |

MDB Distance From Target Impact Point:

Vertical: 8 mm up from target

Horizontal: 5 mm left from target

Arm Rest Locations:

Front: 206 mm below the bottom of the window

Rear: 275 mm below the bottom of the window

Seat Movement:

Front: N/A

Rear: N/A

Glazing Damage:

Windshield: None

Window: Right side windows broken.

Pillar Separation: None

Sill Separation: None

Other Notable Impact Effects:

None

## Section 4

### Occupant and Vehicle Information

Data Sheet 5

SID Instrumentation Data

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509

Test Number: 070323

Driver Dummy Serial Number: 065

| Location                     | Positive Direction |              | Negative Direction |              |
|------------------------------|--------------------|--------------|--------------------|--------------|
|                              | Max.<br>(g)        | Time<br>(ms) | Max.<br>(g)        | Time<br>(ms) |
| Right Upper Rib Acceleration |                    |              |                    |              |
| Lateral (P)                  | 2.1                | 121.9        | 30.0               | 40.6         |
| Lateral (R)                  | 2.2                | 6.9          | 29.8               | 40.0         |
| Right Lower Rib Acceleration |                    |              |                    |              |
| Lateral (P)                  | 2.5                | 6.9          | 31.1               | 41.9         |
| Lateral (R)                  | 2.7                | 6.8          | 30.4               | 41.9         |
| Lower Spine Acceleration     |                    |              |                    |              |
| Lateral (P)                  | 7.5                | 61.9         | 47.3               | 28.1         |
| Lateral (R)                  | 7.0                | 61.8         | 47.7               | 28.1         |
| Pelvis Acceleration          |                    |              |                    |              |
| Lateral (P)                  | 8.7                | 76.9         | 59.8               | 29.4         |
| TTI                          | 39.2               |              |                    |              |

Positive Direction

Longitudinal: Forward

Lateral: Rightward

Vertical: Downward

Negative Direction

Longitudinal: Rearward

Lateral: Leftward

Vertical: Upward

Data Sheet 5 (Continued)

SID Instrumentation Data

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509

Test Number: 070323

Left Rear Dummy Serial Number: 028

| Location                     | Positive Direction |              | Negative Direction |              |
|------------------------------|--------------------|--------------|--------------------|--------------|
|                              | Max.<br>(g)        | Time<br>(ms) | Max.<br>(g)        | Time<br>(ms) |
| Right Upper Rib Acceleration |                    |              |                    |              |
| Lateral (P)                  | 14.6               | 68.2         | 72.2               | 42.5         |
| Lateral (R)                  | 14.5               | 68.2         | 71.2               | 42.5         |
| Right Lower Rib Acceleration |                    |              |                    |              |
| Lateral (P)                  | 20.6               | 66.9         | 69.5               | 42.5         |
| Lateral (R)                  | 19.9               | 67.5         | 68.2               | 42.5         |
| Lower Spine Acceleration     |                    |              |                    |              |
| Lateral (P)                  | 14.2               | 72.5         | 57.2               | 44.4         |
| Lateral (R)                  | 14.2               | 72.5         | 58.7               | 44.4         |
| Pelvis Acceleration          |                    |              |                    |              |
| Lateral (P)                  | 6.0                | 68.7         | 59.6               | 33.8         |
| TTI                          | 64.7               |              |                    |              |

Positive Direction

Longitudinal: Forward

Lateral: Rightward

Vertical: Downward

Negative Direction

Longitudinal: Rearward

Lateral: Leftward

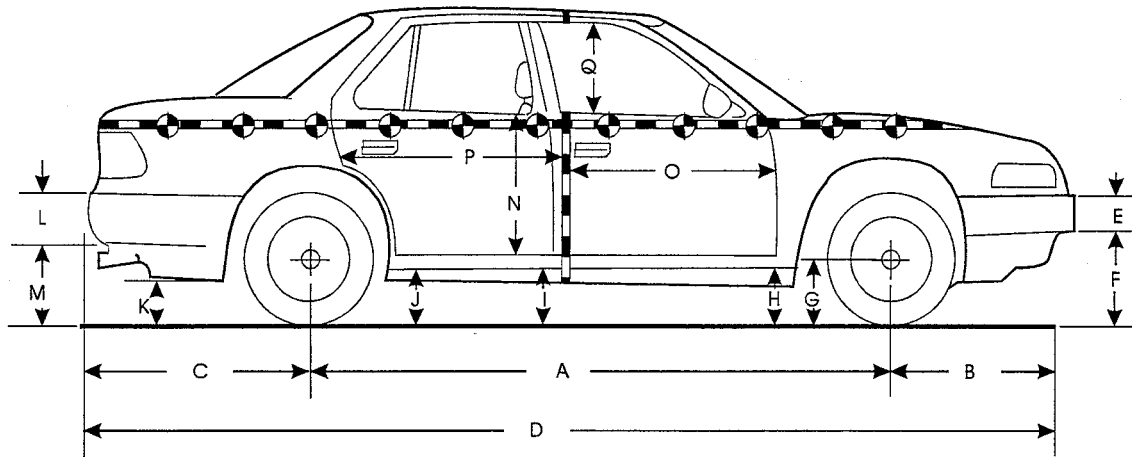
Vertical: Upward

## Data Sheet 6

### Vehicle Pre-Test And Post-Test Measurements

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509



Right Side View

Note: All dimensions are in millimeters with tolerance of  $\pm 3$  mm

|    | Pre-Test<br>(as delivered) | Pre-Test<br>(as tested) | Post-Test<br>(as tested) | Change |
|----|----------------------------|-------------------------|--------------------------|--------|
| A  | 2510                       | 2510                    | 2500                     | 10     |
| B  | 825                        | 825                     | 817                      | 8      |
| C  | 915                        | 915                     | 915                      | 0      |
| D  | 4250                       | 4250                    | 4250                     | 0      |
| E  | 170                        | 170                     | 170                      | 0      |
| F  | 410                        | 404                     | 425                      | -21    |
| G  | 280                        | 280                     | 272                      | 8      |
| H  | 258                        | 243                     | 246                      | -3     |
| I  | 266                        | 235                     | 300                      | -65    |
| J1 | 205                        | 170                     | 197                      | -27    |
| J2 | 260                        | 225                     | 281                      | -56    |
| K  | 295                        | 249                     | 254                      | -5     |
| L  | 325                        | 325                     | 325                      | 0      |
| M  | 340                        | 294                     | 304                      | -10    |
| N  | 760                        | 760                     | 707                      | 53     |
| O  | 683                        | 683                     | 677                      | 6      |
| P  | 1230                       | 1230                    | 1175                     | 55     |
| Q  | 410                        | 410                     | 405                      | 5      |
| R  | 4025                       | 4025                    | 3990                     | 35     |
| S  | 4025                       | 4025                    | 4025                     | 0      |
| T  | 1294                       | 1294                    | 1142                     | 152    |

D = Length at centerline

E and L = Bumper Thickness

R = Right Side Length

S = Left Side Length

T = Width at B-pillar

J1 = To Pinch Weld

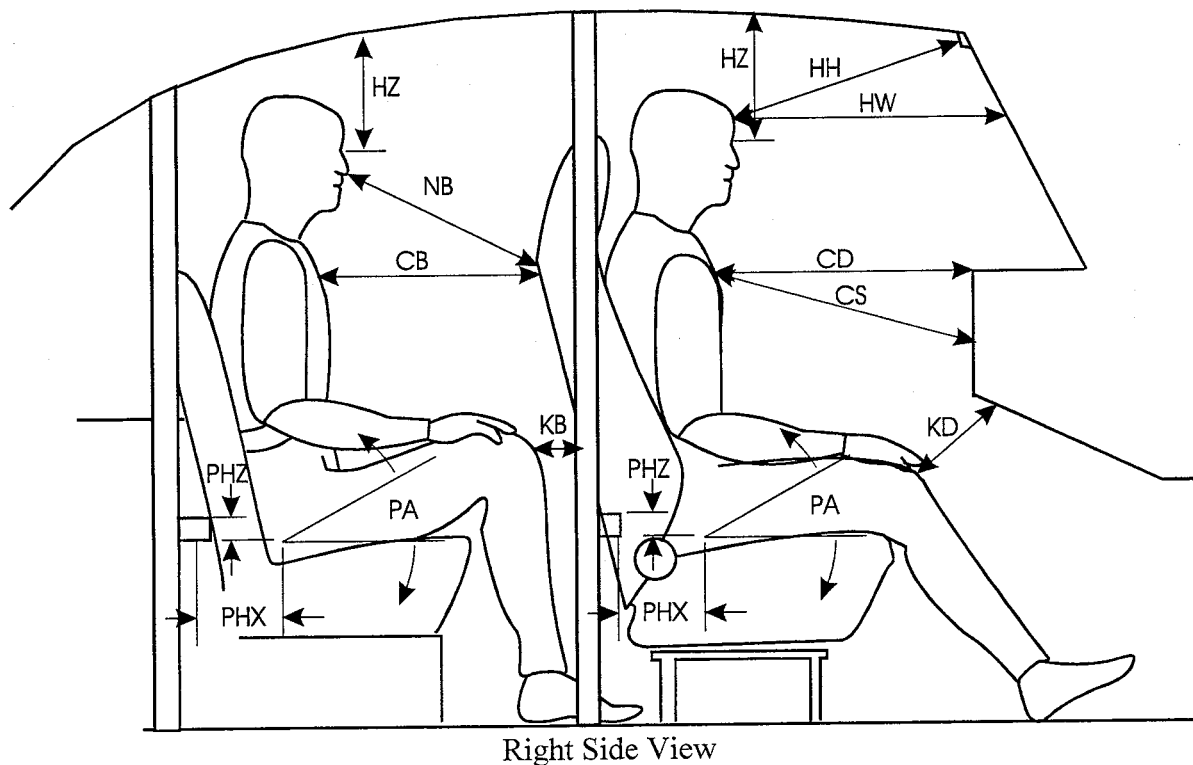
J2 = To Sill

## Data Sheet 7

### SID Longitudinal Clearance Dimensions

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509



Note: All measurements are in millimeters with tolerance of  $\pm 3$  mm

| Measurement         | Right Front Pass. SID # 065 | Right Rear Pass. SID # 028 |
|---------------------|-----------------------------|----------------------------|
| HH                  | 405                         | N/A                        |
| HW                  | 659                         | N/A                        |
| HZ                  | 197                         | 170                        |
| NR/NB               | N/A                         | 5.41                       |
| CD/CB               | 598                         | 488                        |
| CS                  | N/A                         | N/A                        |
| KDL(KDA°)/KBL(KBA°) | 78/(0°)                     | 176/(21°)                  |
| KDR(KDA°)/KBR(KBA°) | 163/(31.9°)                 | 175/(27.1°)                |
| PA°                 | 23.3°                       | 24.8°                      |
| PHX                 | 205                         | 236                        |
| PHZ                 | 150                         | 250                        |

Note: 2-door vehicle shown. Rear dummy PHX and PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

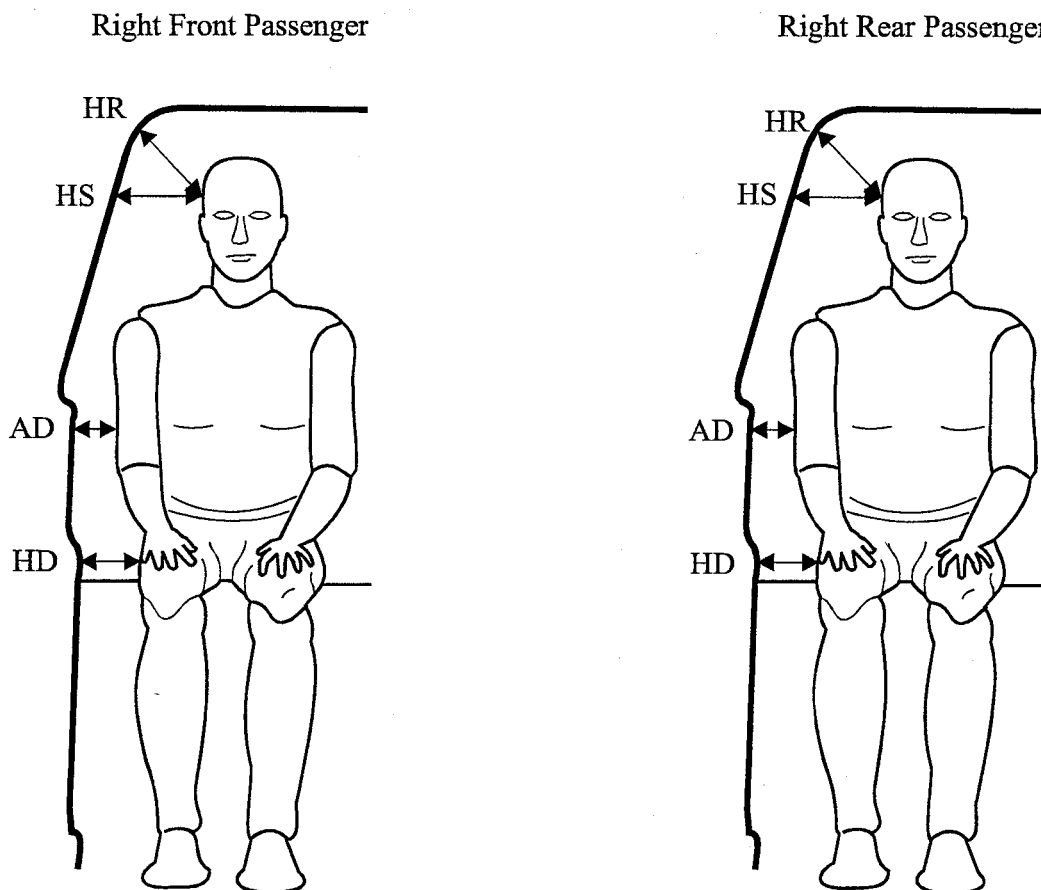


## Data Sheet 8

### SID Lateral Clearance Dimensions

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509



Note: All measurements are in millimeters with tolerance of  $\pm 3$  mm

| Measurement | Right Front Pass. SID # 065 | Right Rear Pass. SID # 028 |
|-------------|-----------------------------|----------------------------|
| HR          | 181                         | 129                        |
| HS          | 245                         | 231                        |
| AD*         | Lower: 106      Upper: 102  | Lower: 93      Upper: 81   |
| HD          | 125                         | 106                        |

\* Lower measurement is taken laterally at center of the lower rib accelerometer height from the SID arm segment to the closest part of the vehicle side.

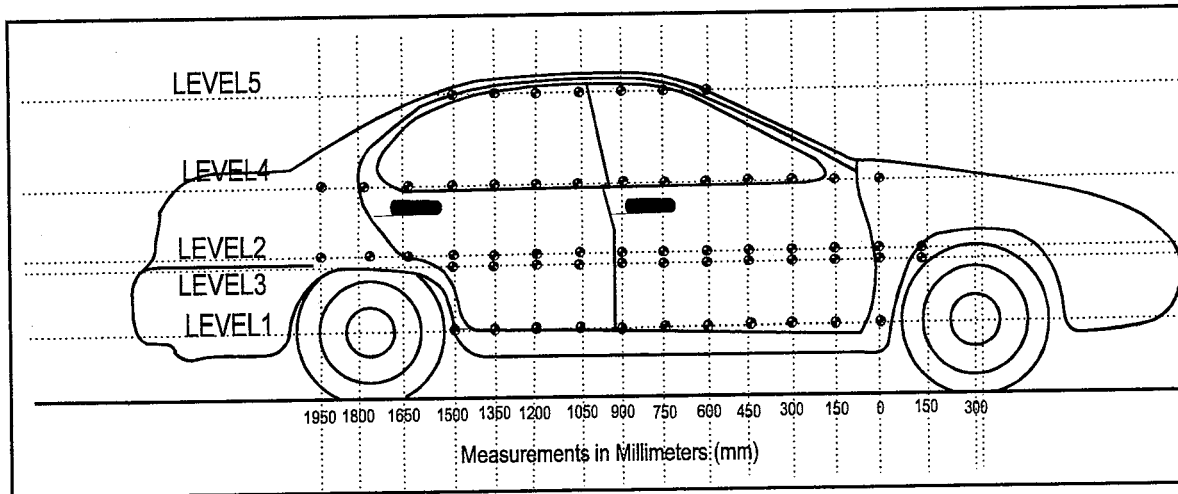
Upper measurement is taken laterally at center of the upper rib accelerometer height from the SID arm segment to the closest part of the vehicle side.

Data Sheet 9

Vehicle Side Measurements

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509



**RIGHT SIDE VIEW**

Level 5 - Window Top

Level 4 - Window Sill

Level 3 - Mid-Door

Level 2 - Occupant H-Point

Level 1 - Axle Centerline Height or Sill Top Height

Measurements Are Taken When The Vehicle Is In The "As Tested" Configuration.

Measurements along the vertical 750 mm line shown above:

|                                                          |   |             |    |
|----------------------------------------------------------|---|-------------|----|
| Level 5 @ Window Top                                     | = | <u>1444</u> | mm |
| Level 4 @ Window Sill                                    | = | <u>940</u>  | mm |
| Level 3 @ Mid Door                                       | = | <u>665</u>  | mm |
| Level 2 @ Occupant H-Point                               | = | <u>554</u>  | mm |
| Level 1 @ Axle Centerline Height<br>(or Sill Top Height) | = | <u>260</u>  | mm |

Data Sheet 10

Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509

|                           |        | (mm) From Impact Point |       |       |      |      |      |      |      |      |     |     |     |     |     |     |
|---------------------------|--------|------------------------|-------|-------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|
| Location                  | Height |                        | -1200 | -1050 | -900 | -750 | -600 | -450 | -300 | -150 | 0   | 150 | 300 | 450 | 600 | 750 |
| Level 1<br>Side Sill      | 260    | Pre                    | ---   | ---   | ---  | ---  | ---  | ---  | ---  | ---  | --- | 784 | 781 | 782 | 782 | 781 |
|                           |        | Post                   | ---   | ---   | ---  | ---  | ---  | ---  | ---  | ---  | --- | 776 | 726 | 724 | 723 | 723 |
|                           |        | Crush                  | ---   | ---   | ---  | ---  | ---  | ---  | ---  | ---  | --- | 8   | 55  | 58  | 59  | 58  |
| Level 2<br>H-Point        | 554    | Pre                    | ---   | ---   | ---  | 774  | 827  | ---  | ---  | ---  | 842 | 842 | 842 | 844 | 845 | 846 |
|                           |        | Post                   | ---   | ---   | ---  | 782  | 833  | ---  | ---  | ---  | 828 | 799 | 601 | 598 | 595 | 593 |
|                           |        | Crush                  | ---   | ---   | ---  | -8   | -6   | ---  | ---  | ---  | 14  | 43  | 241 | 246 | 250 | 253 |
| Level 3<br>Mid-Door       | 665    | Pre                    | ---   | ---   | ---  | 763  | 795  | 836  | 846  | 845  | 830 | 834 | 836 | 838 | 839 | 840 |
|                           |        | Post                   | ---   | ---   | ---  | 773  | 804  | 844  | 853  | 848  | 831 | 845 | 658 | 666 | 666 | 655 |
|                           |        | Crush                  | ---   | ---   | ---  | -10  | -9   | -8   | -7   | -3   | -1  | -11 | 178 | 172 | 173 | 185 |
| Level 4<br>Window<br>Sill | 940    | Pre                    | ---   | ---   | ---  | ---  | 705  | 729  | 743  | 756  | 766 | 776 | 784 | 792 | 798 | 801 |
|                           |        | Post                   | ---   | ---   | ---  | ---  | 717  | 739  | 748  | 759  | 762 | 755 | 715 | 678 | 679 | 680 |
|                           |        | Crush                  | ---   | ---   | ---  | ---  | -12  | -10  | -5   | -3   | 4   | 21  | 69  | 114 | 119 | 121 |
| Level 5<br>Window<br>Top  | 1444   | Pre                    | ---   | ---   | ---  | ---  | ---  | ---  | ---  | ---  | --- | --- | --- | --- | --- | 532 |
|                           |        | Post                   | ---   | ---   | ---  | ---  | ---  | ---  | ---  | ---  | --- | --- | --- | --- | --- | 534 |
|                           |        | Crush                  | ---   | ---   | ---  | ---  | ---  | ---  | ---  | ---  | --- | --- | --- | --- | --- | -2  |

Data Sheet 10 (Continued)

Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509

| Location                  | Height |       | (mm) From Impact Point |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|--------|-------|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
|                           |        |       | 900                    | 1050 | 1200 | 1350 | 1500 | 1650 | 1800 | 1950 | 2100 | 2250 | 2400 | 2550 | 2700 |
| Level 1<br>Side Sill      | 260    | Pre   | 780                    | 780  | 780  | 781  | 781  | 780  | 781  | ---  | ---  | ---  | ---  | ---  | ---  |
|                           |        | Post  | 724                    | 723  | 727  | 711  | 727  | 750  | 768  | ---  | ---  | ---  | ---  | ---  | ---  |
|                           |        | Crush | 56                     | 57   | 53   | 70   | 54   | 30   | 13   | ---  | ---  | ---  | ---  | ---  | ---  |
| Level 2<br>H-Point        | 554    | Pre   | 846                    | 845  | 843  | 843  | 841  | 839  | 834  | 846  | ---  | ---  | ---  | 810  | 790  |
|                           |        | Post  | 593                    | 594  | 602  | 608  | 640  | 665  | 724  | 814  | ---  | ---  | ---  | 826  | 811  |
|                           |        | Crush | 253                    | 251  | 241  | 235  | 201  | 174  | 110  | 32   | ---  | ---  | ---  | -16  | -21  |
| Level 3<br>Mid-Door       | 665    | Pre   | 841                    | 842  | 841  | 841  | 840  | 839  | 837  | 843  | 851  | 847  | 833  | 808  | 791  |
|                           |        | Post  | 667                    | 666  | 651  | 666  | 680  | 671  | 713  | 816  | 836  | 850  | 844  | 821  | 808  |
|                           |        | Crush | 174                    | 176  | 190  | 175  | 160  | 168  | 124  | 27   | 15   | -3   | -11  | -13  | -17  |
| Level 4<br>Window<br>Sill | 940    | Pre   | 803                    | 804  | 805  | 805  | 804  | 803  | 802  | 799  | 795  | 790  | 783  | 772  | 0    |
|                           |        | Post  | 678                    | 677  | 659  | 664  | 671  | 676  | 701  | 775  | 826  | 793  | 795  | 793  | 0    |
|                           |        | Crush | 125                    | 127  | 146  | 141  | 133  | 127  | 101  | 24   | -31  | -3   | -12  | -21  | 0    |
| Level 5<br>Window<br>Top  | 1444   | Pre   | 544                    | 548  | 551  | 551  | 551  | 548  | 541  | 527  | ---  | ---  | ---  | ---  | ---  |
|                           |        | Post  | 547                    | 548  | 546  | 547  | 549  | 551  | 548  | 537  | ---  | ---  | ---  | ---  | ---  |
|                           |        | Crush | -3                     | 0    | 5    | 4    | 2    | -3   | -7   | -10  | ---  | ---  | ---  | ---  | ---  |

All measurements were recorded using TRC Inc.'s FARO Arm with a tolerance of  $\pm 0.1$  mm.

Data Sheet 12 (Continued)

Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509

|                                          |                 | Distance Right of Center (mm) |     |     |     |     |     |     |     |     | Distance Left of Center (mm) |     |     |     |     |     |     |     |
|------------------------------------------|-----------------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|-----|-----|
| Location                                 | Height<br>At CL | 800                           | 700 | 600 | 500 | 400 | 300 | 200 | 100 | 0   | 100                          | 200 | 300 | 400 | 500 | 600 | 700 | 800 |
| Top Stack Level<br>- Level D             | 814             | -125                          | -87 | -44 | -18 | -9  | -5  | -4  | -3  | -8  | -10                          | -14 | -5  | 4   | 7   | 6   | 4   | -20 |
| Mid Level<br>Level C                     | 686             | -62                           | -47 | -10 | -7  | -5  | -3  | -4  | -5  | -4  | -4                           | -12 | -3  | -1  | 0   | 2   | 4   | -7  |
| Top Bumper<br>Level-Level B <sup>1</sup> | 559             | -34                           | -29 | -22 | -20 | -18 | -17 | -15 | -14 | -14 | -14                          | -13 | -13 | -13 | -13 | -14 | -31 | -45 |
| Mid Bumper<br>Level - Level A            | 432             | -76                           | -80 | -65 | -61 | -59 | -57 | -55 | -54 | -54 | -54                          | -53 | -56 | -52 | -52 | -56 | -72 | -91 |

All measurements were recorded using TRC Inc.'s FARO Arm with a tolerance of  $\pm 0.1$  mm.

<sup>1</sup> Top Bumper measurements are collected at 560 mm to eliminate post-test measurement point obstruction by the bumper element.

Data Sheet 12 (Continued)

Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2007 Kia Rio 4-door

Deformable Barrier Face Profile

NHTSA No.: C70509

Pre-Test

| Index | Xmm    | Ymm    | Zmm    |
|-------|--------|--------|--------|
| 1     | -385.4 | 801.2  | -50.2  |
| 2     | -385.2 | 700.8  | -50.6  |
| 3     | -385.3 | 600.9  | -50.9  |
| 4     | -385.4 | 500.7  | -51.3  |
| 5     | -385.5 | 401.0  | -51.5  |
| 6     | -385.6 | 300.9  | -51.5  |
| 7     | -385.6 | 200.9  | -51.8  |
| 8     | -385.8 | 100.7  | -51.9  |
| 9     | -385.7 | 1.0    | -52.7  |
| 10    | -385.8 | -99.2  | -53.2  |
| 11    | -385.7 | -199.2 | -53.0  |
| 12    | -385.6 | -299.1 | -53.3  |
| 13    | -385.5 | -399.5 | -53.8  |
| 14    | -385.5 | -499.1 | -53.9  |
| 15    | -385.4 | -599.2 | -54.2  |
| 16    | -385.1 | -699.3 | -54.5  |
| 17    | -385.2 | -799.5 | -54.8  |
| 18    | -384.9 | 801.4  | -177.8 |
| 19    | -384.8 | 701.4  | -178.4 |
| 20    | -385.0 | 601.3  | -178.9 |
| 21    | -385.0 | 501.3  | -178.9 |
| 22    | -385.2 | 401.5  | -179.3 |
| 23    | -385.2 | 301.1  | -179.9 |

Post-Test

| Index | Xmm    | Ymm    | Zmm    |
|-------|--------|--------|--------|
| 1     | -260.3 | 785.8  | -74.1  |
| 2     | -298.1 | 695.9  | -66.7  |
| 3     | -341.6 | 606.6  | -58.5  |
| 4     | -367.6 | 509.8  | -56.3  |
| 5     | -376.4 | 410.3  | -57.5  |
| 6     | -380.2 | 310.1  | -58.9  |
| 7     | -382.1 | 209.9  | -60.8  |
| 8     | -382.4 | 109.6  | -62.7  |
| 9     | -377.8 | 10.0   | -65.9  |
| 10    | -375.6 | -90.3  | -68.3  |
| 11    | -372.0 | -190.2 | -69.9  |
| 12    | -380.9 | -289.3 | -72.0  |
| 13    | -389.7 | -389.7 | -74.1  |
| 14    | -392.3 | -489.7 | -76.2  |
| 15    | -391.7 | -589.7 | -78.6  |
| 16    | -389.0 | -689.7 | -80.7  |
| 17    | -365.0 | -785.9 | -83.9  |
| 18    | -322.5 | 792.5  | -182.8 |
| 19    | -337.7 | 704.1  | -187.8 |
| 20    | -374.5 | 613.2  | -181.7 |
| 21    | -377.9 | 513.1  | -182.9 |
| 22    | -380.6 | 413.1  | -184.8 |
| 23    | -381.8 | 312.7  | -186.9 |

Difference

| Index | Xmm    | Ymm   | Zmm  |
|-------|--------|-------|------|
| 1     | -125.1 | 15.4  | 23.9 |
| 2     | -87.1  | 4.9   | 16.1 |
| 3     | -43.7  | -5.7  | 7.6  |
| 4     | -17.8  | -9.1  | 5.0  |
| 5     | -9.1   | -9.3  | 6.0  |
| 6     | -5.4   | -9.2  | 7.4  |
| 7     | -3.5   | -9.0  | 9.0  |
| 8     | -3.4   | -8.9  | 10.8 |
| 9     | -7.9   | -9.0  | 13.2 |
| 10    | -10.2  | -8.9  | 15.1 |
| 11    | -13.7  | -9.0  | 16.9 |
| 12    | -4.7   | -9.8  | 18.7 |
| 13    | 4.2    | -9.8  | 20.3 |
| 14    | 6.8    | -9.4  | 22.3 |
| 15    | 6.3    | -9.5  | 24.4 |
| 16    | 3.9    | -9.6  | 26.2 |
| 17    | -20.2  | -13.6 | 29.1 |
| 18    | -62.4  | 8.9   | 5.0  |
| 19    | -47.1  | -2.7  | 9.4  |
| 20    | -10.5  | -11.9 | 2.8  |
| 21    | -7.1   | -11.8 | 4.0  |
| 22    | -4.6   | -11.6 | 5.5  |
| 23    | -3.4   | -11.6 | 7.0  |

# Data Sheet 12 (Continued)

## Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2007 Kia Rio 4-door

Deformable Barrier Face Profile Cont'd.

NHTSA No.: C70509

### Pre-Test

| Index | Xmm    | Ymm    | Zmm    |
|-------|--------|--------|--------|
| 24    | -385.4 | 201.4  | -179.9 |
| 25    | -385.4 | 101.2  | -180.3 |
| 26    | -385.3 | 1.2    | -181.2 |
| 27    | -385.3 | -98.9  | -181.3 |
| 28    | -385.4 | -199.3 | -181.7 |
| 29    | -385.3 | -299.0 | -181.8 |
| 30    | -385.2 | -399.3 | -182.0 |
| 31    | -385.0 | -499.2 | -182.4 |
| 32    | -384.8 | -599.2 | -182.6 |
| 33    | -384.7 | -699.2 | -183.1 |
| 34    | -384.5 | -799.1 | -183.2 |
| 35    | -384.2 | 801.8  | -305.3 |
| 36    | -384.4 | 701.9  | -305.9 |
| 37    | -384.5 | 601.6  | -306.3 |
| 38    | -384.6 | 502.0  | -306.9 |
| 39    | -384.7 | 401.9  | -306.8 |
| 40    | -384.8 | 301.8  | -307.0 |
| 41    | -385.0 | 201.9  | -307.1 |
| 42    | -384.9 | 101.9  | -307.6 |
| 43    | -384.9 | 2.0    | -308.2 |
| 44    | -385.0 | -97.9  | -308.1 |
| 45    | -384.9 | -198.0 | -308.2 |
| 46    | -384.8 | -298.0 | -308.3 |

### Post-Test

| Index | Xmm    | Ymm    | Zmm    |
|-------|--------|--------|--------|
| 24    | -381.0 | 212.8  | -188.7 |
| 25    | -380.1 | 112.5  | -190.8 |
| 26    | -380.9 | 12.5   | -193.7 |
| 27    | -381.4 | -87.7  | -195.9 |
| 28    | -373.1 | -187.6 | -198.2 |
| 29    | -382.1 | -287.0 | -199.9 |
| 30    | -384.2 | -387.4 | -202.0 |
| 31    | -385.5 | -487.2 | -204.3 |
| 32    | -387.2 | -587.3 | -206.6 |
| 33    | -388.6 | -687.3 | -209.2 |
| 34    | -377.5 | -786.1 | -211.3 |
| 35    | -350.4 | 812.3  | -299.6 |
| 36    | -355.6 | 715.7  | -302.7 |
| 37    | -362.3 | 615.3  | -306.1 |
| 38    | -364.2 | 515.6  | -307.9 |
| 39    | -366.5 | 415.6  | -310.0 |
| 40    | -367.9 | 315.4  | -312.7 |
| 41    | -369.6 | 215.6  | -315.0 |
| 42    | -371.1 | 115.6  | -317.5 |
| 43    | -371.1 | 15.7   | -319.6 |
| 44    | -371.5 | -84.0  | -321.7 |
| 45    | -372.3 | -184.1 | -323.9 |
| 46    | -371.6 | -284.0 | -325.3 |

### Difference

| Index | Xmm   | Ymm   | Zmm  |
|-------|-------|-------|------|
| 24    | -4.4  | -11.4 | 8.8  |
| 25    | -5.3  | -11.3 | 10.5 |
| 26    | -4.4  | -11.3 | 12.5 |
| 27    | -3.9  | -11.2 | 14.6 |
| 28    | -12.3 | -11.7 | 16.5 |
| 29    | -3.2  | -12.0 | 18.1 |
| 30    | -1.0  | -11.9 | 20.0 |
| 31    | 0.5   | -12.0 | 21.9 |
| 32    | 2.4   | -11.9 | 24.0 |
| 33    | 3.9   | -11.9 | 26.1 |
| 34    | -7.0  | -13.0 | 28.1 |
| 35    | -33.8 | -10.5 | -5.7 |
| 36    | -28.8 | -13.8 | -3.2 |
| 37    | -22.2 | -13.7 | -0.2 |
| 38    | -20.4 | -13.6 | 1.0  |
| 39    | -18.2 | -13.7 | 3.2  |
| 40    | -16.9 | -13.6 | 5.7  |
| 41    | -15.4 | -13.7 | 7.9  |
| 42    | -13.8 | -13.7 | 9.9  |
| 43    | -13.8 | -13.7 | 11.4 |
| 44    | -13.5 | -13.9 | 13.6 |
| 45    | -12.6 | -13.9 | 15.7 |
| 46    | -13.2 | -14.0 | 17.0 |

# Data Sheet 12 (Continued)

## Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2007 Kia Rio 4-door

Deformable Barrier Face Profile Cont'd.

NHTSA No.: C70509

### Pre-Test

| Index | Xmm    | Ymm    | Zmm    |
|-------|--------|--------|--------|
| 47    | -384.8 | -398.2 | -308.7 |
| 48    | -384.6 | -498.2 | -309.1 |
| 49    | -384.4 | -597.9 | -309.3 |
| 50    | -384.2 | -698.2 | -309.4 |
| 51    | -383.8 | -798.1 | -309.3 |
| 52    | -471.4 | 799.7  | -431.0 |
| 53    | -485.3 | 703.7  | -432.2 |
| 54    | -485.5 | 603.7  | -432.9 |
| 55    | -485.7 | 503.7  | -433.1 |
| 56    | -485.7 | 403.6  | -433.3 |
| 57    | -485.8 | 303.6  | -433.8 |
| 58    | -485.8 | 203.4  | -434.1 |
| 59    | -486.0 | 103.2  | -434.6 |
| 60    | -485.9 | 3.1    | -434.9 |
| 61    | -485.9 | -97.2  | -435.8 |
| 62    | -485.9 | -196.9 | -435.8 |
| 63    | -485.8 | -296.7 | -436.2 |
| 64    | -485.8 | -396.7 | -436.6 |
| 65    | -485.6 | -496.9 | -436.8 |
| 66    | -485.4 | -597.1 | -437.4 |
| 67    | -485.5 | -697.3 | -437.6 |
| 68    | -472.9 | -793.2 | -437.7 |

### Post-Test

| Index | Xmm    | Ymm    | Zmm    |
|-------|--------|--------|--------|
| 47    | -371.7 | -384.1 | -327.4 |
| 48    | -372.0 | -483.9 | -329.8 |
| 49    | -370.7 | -583.6 | -331.6 |
| 50    | -353.5 | -682.1 | -329.0 |
| 51    | -339.2 | -780.4 | -328.4 |
| 52    | -395.5 | 817.4  | -428.6 |
| 53    | -405.2 | 721.0  | -434.2 |
| 54    | -420.2 | 621.7  | -440.1 |
| 55    | -424.6 | 521.6  | -443.4 |
| 56    | -426.6 | 421.8  | -446.0 |
| 57    | -428.9 | 321.7  | -449.2 |
| 58    | -430.8 | 221.6  | -452.1 |
| 59    | -432.3 | 121.3  | -455.1 |
| 60    | -432.2 | 21.3   | -458.0 |
| 61    | -431.6 | -79.0  | -461.0 |
| 62    | -433.2 | -179.0 | -463.7 |
| 63    | -429.9 | -279.0 | -465.6 |
| 64    | -434.1 | -378.9 | -469.5 |
| 65    | -433.9 | -479.1 | -472.1 |
| 66    | -429.1 | -579.3 | -474.5 |
| 67    | -413.9 | -678.1 | -473.8 |
| 68    | -382.1 | -770.5 | -468.9 |

### Difference

| Index | Xmm   | Ymm   | Zmm  |
|-------|-------|-------|------|
| 47    | -13.1 | -14.1 | 18.7 |
| 48    | -12.6 | -14.3 | 20.7 |
| 49    | -13.7 | -14.3 | 22.3 |
| 50    | -30.7 | -16.1 | 19.6 |
| 51    | -44.6 | -17.7 | 19.1 |
| 52    | -75.9 | -17.7 | -2.4 |
| 53    | -80.1 | -17.3 | 2.0  |
| 54    | -65.3 | -18.0 | 7.2  |
| 55    | -61.1 | -17.9 | 10.3 |
| 56    | -59.1 | -18.2 | 12.7 |
| 57    | -56.9 | -18.1 | 15.4 |
| 58    | -55.0 | -18.2 | 18.0 |
| 59    | -53.7 | -18.1 | 20.5 |
| 60    | -53.7 | -18.2 | 23.1 |
| 61    | -54.3 | -18.2 | 25.2 |
| 62    | -52.7 | -17.9 | 27.9 |
| 63    | -55.9 | -17.7 | 29.4 |
| 64    | -51.7 | -17.8 | 32.9 |
| 65    | -51.7 | -17.8 | 35.3 |
| 66    | -56.3 | -17.8 | 37.1 |
| 67    | -71.6 | -19.2 | 36.2 |
| 68    | -90.8 | -22.7 | 31.2 |



Data Sheet 13 (Continued)

Test Vehicle Accelerometer Locations and Data Summary

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509

| Location                               | Coordinates<br>(millimeters) |      |      | Positive Direction |              | Negative Direction |              |
|----------------------------------------|------------------------------|------|------|--------------------|--------------|--------------------|--------------|
|                                        | X                            | Y    | Z    | Max.<br>(g)        | Time<br>(ms) | Max.<br>(g)        | Time<br>(ms) |
| 7 Left Rear<br>Occupant<br>Compartment | 1870                         | -655 | -311 |                    |              |                    |              |
| Longitudinal                           |                              |      |      |                    |              |                    |              |
| Lateral                                |                              |      |      | 3.2                | 83.7         | 22.1               | 7.0          |
| Vertical                               |                              |      |      |                    |              |                    |              |
| Resultant                              |                              |      |      |                    |              |                    |              |
| 12 Right Lower<br>B-Pillar             | 2285                         | 745  | -512 |                    |              |                    |              |
| Longitudinal                           |                              |      |      |                    |              |                    |              |
| Lateral <sup>1</sup>                   |                              |      |      | ----               | ----         | ----               | ----         |
| Vertical                               |                              |      |      |                    |              |                    |              |
| Resultant                              |                              |      |      |                    |              |                    |              |
| 13 Right Middle<br>B-Pillar            | 2250                         | 760  | -893 |                    |              |                    |              |
| Longitudinal                           |                              |      |      |                    |              |                    |              |
| Lateral                                |                              |      |      | 20.6               | 19.4         | 115.3              | 5.0          |
| Vertical                               |                              |      |      |                    |              |                    |              |
| Resultant                              |                              |      |      |                    |              |                    |              |
| 14 Right Lower<br>A-Pillar             | 3250                         | 765  | -487 |                    |              |                    |              |
| Longitudinal                           |                              |      |      |                    |              |                    |              |
| Lateral                                |                              |      |      | 20.9               | 18.4         | 102.2              | 2.3          |
| Vertical                               |                              |      |      |                    |              |                    |              |
| Resultant                              |                              |      |      |                    |              |                    |              |
| 15 Right Middle<br>A-Pillar            | 3245                         | 750  | -842 |                    |              |                    |              |
| Longitudinal                           |                              |      |      |                    |              |                    |              |
| Lateral                                |                              |      |      | 13.1               | 10.4         | 48.3               | 3.3          |
| Vertical                               |                              |      |      |                    |              |                    |              |
| Resultant                              |                              |      |      |                    |              |                    |              |

Data Sheet 13 (Continued)

Test Vehicle Accelerometer Locations and Data Summary

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509

| Location                     | Coordinates<br>(millimeters) |     |      | Positive Direction |              | Negative Direction |              |
|------------------------------|------------------------------|-----|------|--------------------|--------------|--------------------|--------------|
|                              | X                            | Y   | Z    | Max.<br>(g)        | Time<br>(ms) | Max.<br>(g)        | Time<br>(ms) |
| 16 Right Front Seat<br>Track | 2510                         | 550 | -308 |                    |              |                    |              |
| Longitudinal                 |                              |     |      |                    |              |                    |              |
| Lateral                      |                              |     |      | 12.0               | 22.0         | 108.9              | 13.4         |
| Vertical                     |                              |     |      |                    |              |                    |              |
| Resultant                    |                              |     |      |                    |              |                    |              |
| 17 Right Rear Seat<br>Track  | 1645                         | 535 | -405 |                    |              |                    |              |
| Longitudinal                 |                              |     |      |                    |              |                    |              |
| Lateral                      |                              |     |      | 16.7               | 18.7         | 51.6               | 13.9         |
| Vertical                     |                              |     |      |                    |              |                    |              |
| Resultant                    |                              |     |      |                    |              |                    |              |
| 18 Vehicle CG                | 2645                         | 0   | -508 |                    |              |                    |              |
| Longitudinal                 |                              |     |      | 4.3                | 61.7         | 13.5               | 29.3         |
| Lateral                      |                              |     |      | 89.2               | 23.4         | 129.9              | 17.4         |
| Vertical                     |                              |     |      | 19.8               | 19.9         | 7.8                | 43.3         |
| Resultant                    |                              |     |      | 130.6              | 17.4         |                    |              |

Reference:   X: + Forward from rear bumper  
                   Y: + Rightward from vehicle centerline  
                   Z: + Downward from ground level

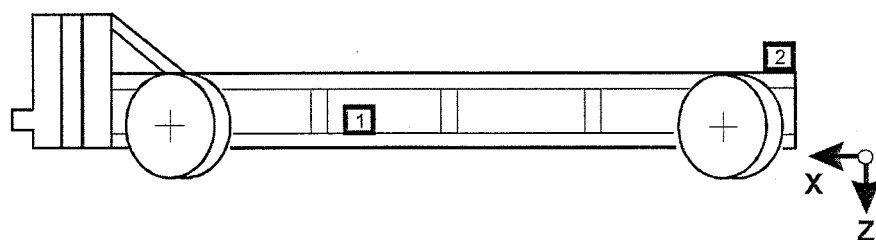
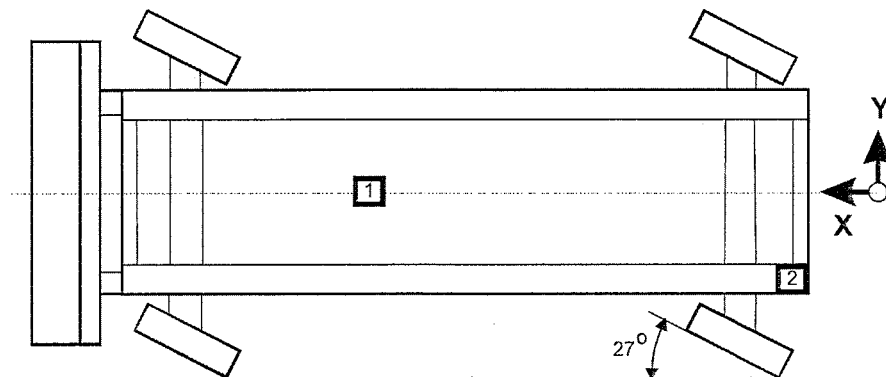
For acceleration data sign convention see Report Sign Convention in Appendix D.

# Data Sheet 14

## MDB Accelerometer Locations and Data Summary

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509



| Accel.<br>No. | Location              | Coordinates<br>(millimeters) |      |      | Positive Direction |              | Negative Direction |              |
|---------------|-----------------------|------------------------------|------|------|--------------------|--------------|--------------------|--------------|
|               |                       | X*                           | Y*   | Z*   | Max.<br>(g)        | Time<br>(ms) | Max.<br>(g)        | Time<br>(ms) |
| 1             | MDB Center of Gravity | 1855                         | 0    | -520 |                    |              |                    |              |
|               | Longitudinal X        |                              |      |      | 3.4                | 120.9        | 21.4               | 39.0         |
|               | Lateral Y             |                              |      |      | 6.7                | 36.0         | 3.9                | 55.2         |
|               | Vertical Z            |                              |      |      | 6.6                | 36.7         | 6.1                | 43.5         |
|               | Resultant R           |                              |      |      | 22.2               | 38.5         |                    |              |
| 2             | Rear Frame Member     | 412                          | -677 | -625 |                    |              |                    |              |
|               | Longitudinal X        |                              |      |      | 1.4                | 94.6         | 15.7               | 44.3         |
|               | Lateral Y             |                              |      |      | 3.0                | 49.0         | 4.7                | 20.9         |

\*Reference: X = Rear Bumper (+ Forward)

Y = Vehicle Centerline (+ To Right)

Z = Ground Level (+ Down)

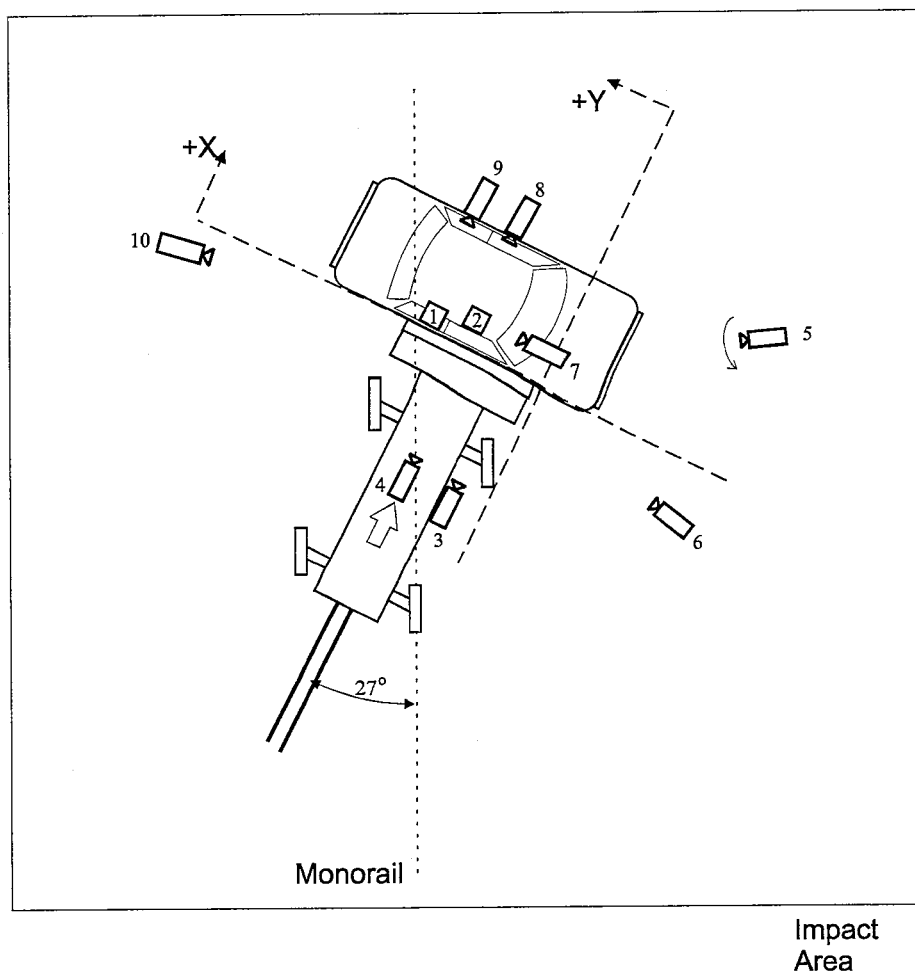
All measurements accurate to within  $\pm 3$  mm.

## Data Sheet 15

### High-Speed Camera Locations and Data Summary

Vehicle: 2007 Kia Rio 4-door

NHTSA No.: C70509



| Camera Number | Location                | Location, <sup>1</sup> mm |     |     | Angle (deg.) | Lens (mm) | Speed (fps) |
|---------------|-------------------------|---------------------------|-----|-----|--------------|-----------|-------------|
|               |                         | X                         | Y   | Z   |              |           |             |
| 1             | Overhead wide           | N/A                       | N/A | N/A | N/A          | 12.5      | 1000        |
| 2             | Overhead tight          | N/A                       | N/A | N/A | N/A          | 25        | 1000        |
| 3             | Right side of MDB       | N/A                       | N/A | N/A | N/A          | 12.5      | 1000        |
| 4             | Onboard MDB center      | N/A                       | N/A | N/A | N/A          | 12.5      | 1000        |
| 5             | Documentary/Panning     | N/A                       | N/A | N/A | N/A          | Zoom      | 30          |
| 6             | Right side wide         | N/A                       | N/A | N/A | N/A          | 12.5      | 1000        |
| 7             | Onboard vehicle front   | N/A                       | N/A | N/A | N/A          | 12.5      | 1000        |
| 8             | Onboard side front door | N/A                       | N/A | N/A | N/A          | 6.5       | 1000        |
| 9             | Onboard vehicle rear    | N/A                       | N/A | N/A | N/A          | 6.5       | 1000        |
| 10            | Left quarter wide       | N/A                       | N/A | N/A | N/A          | 25        | 1000        |

+X: Forward (referenced to MDB) from impact point

+Y: Rightward (referenced to MDB) from impact point

+Z: Downward from ground level

<sup>1</sup> Camera location not recorded prior to test.

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Figure A-1 Pre-Test Front View of Test Vehicle



Figure A-2 Post-Test Front View of Test Vehicle



Figure A-3 Pre-Test Left Front View of Test Vehicle



Figure A-4 Post-Test Left Front View of Test Vehicle



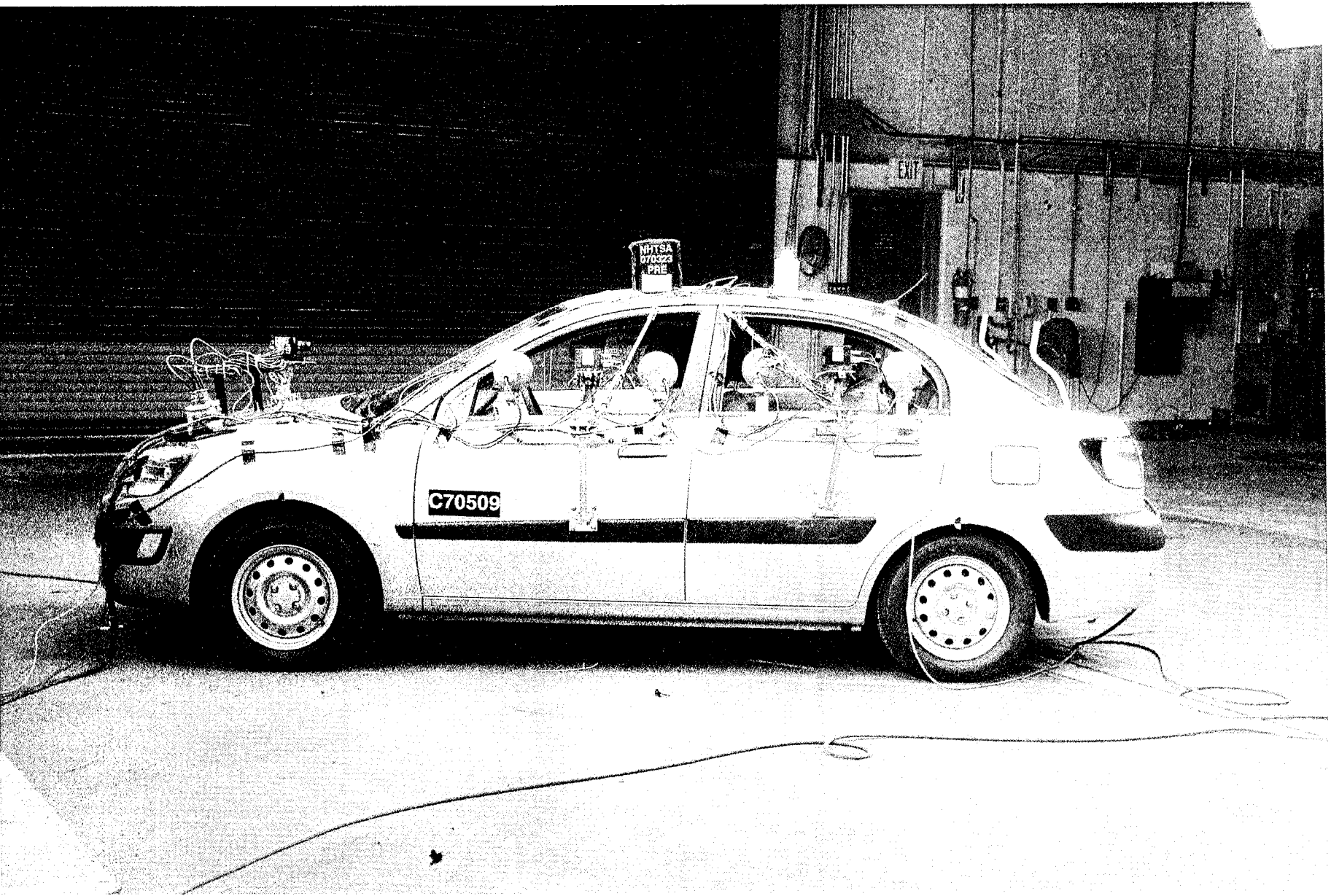


Figure A-5 Pre-Test Left Side View of Test Vehicle



Figure A-6 Post-Test Left Side View of Test Vehicle

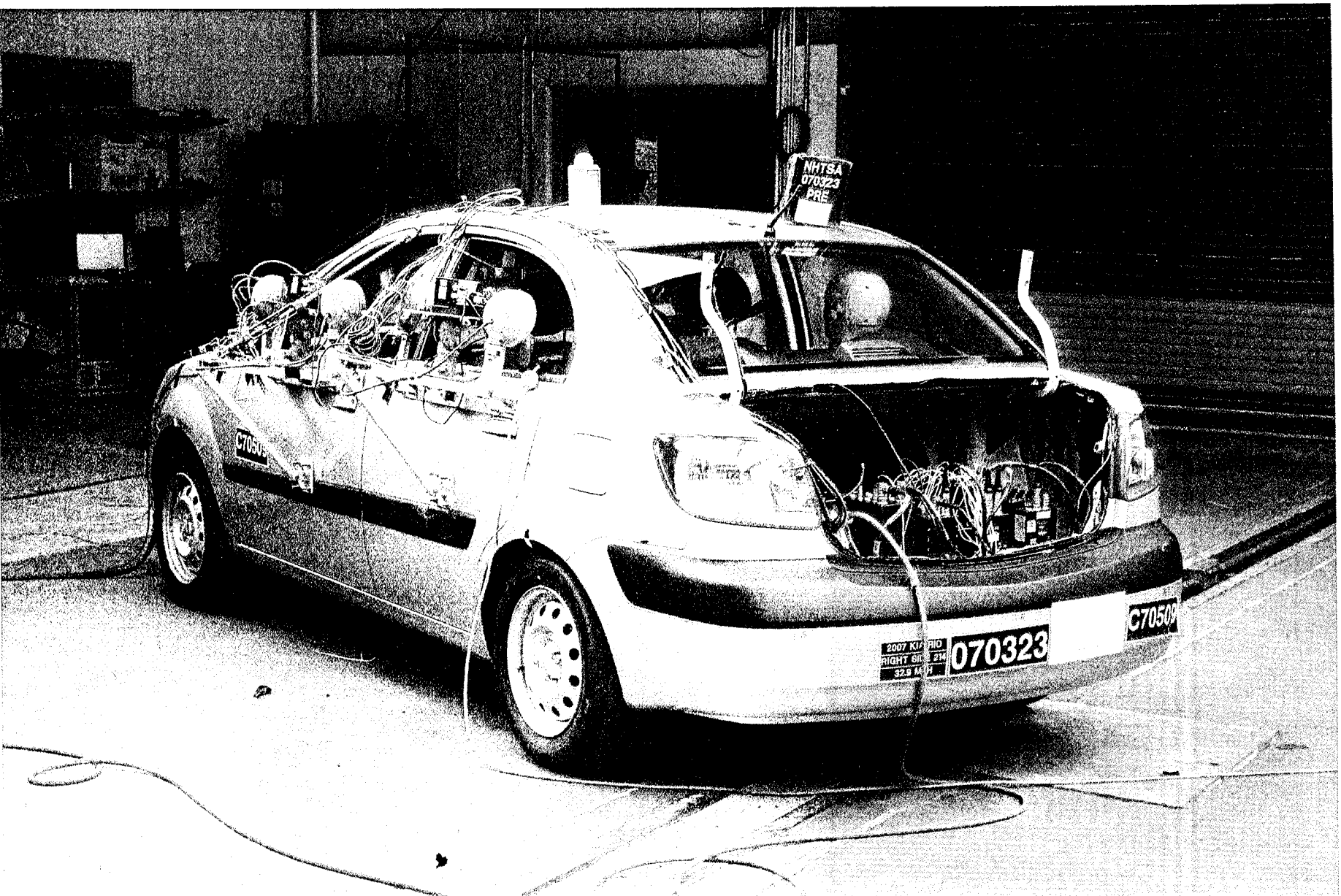


Figure A-7 Pre-Test Left Rear View of Test Vehicle



Figure A-10 Post-Test Rear View of Test Vehicle





Figure A-11 Pre-Test Right Rear View of Test Vehicle



Figure A-12 Post-Test Right Rear View of Test Vehicle

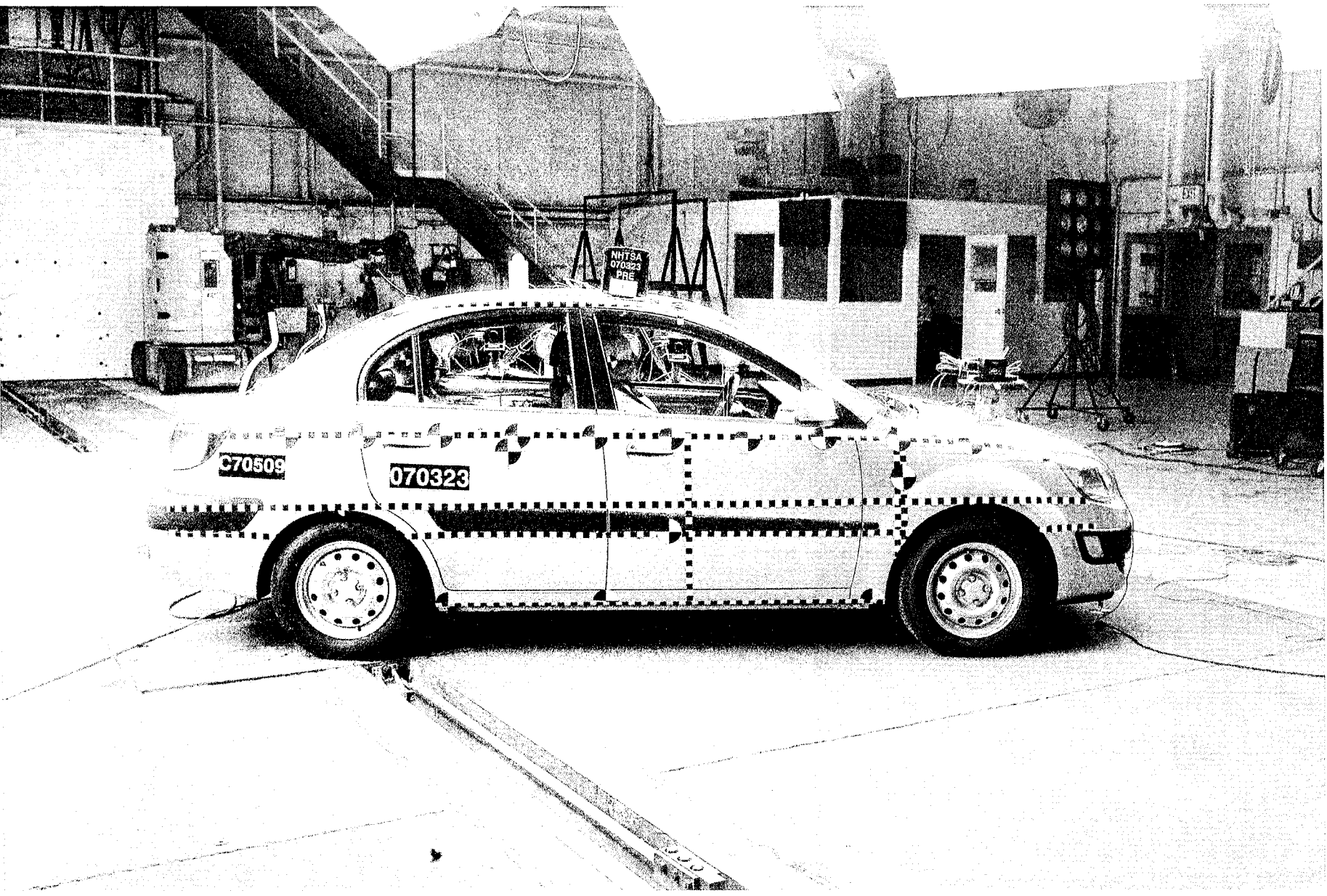


Figure A-13 Pre-Test Impacted Side View of Test Vehicle



Figure A-14 Post-Test Impacted Side View of Test Vehicle





Figure A-15 Pre-Test Right Front View of Test Vehicle



Figure A-16 Post-Test Right Front View of Test Vehicle

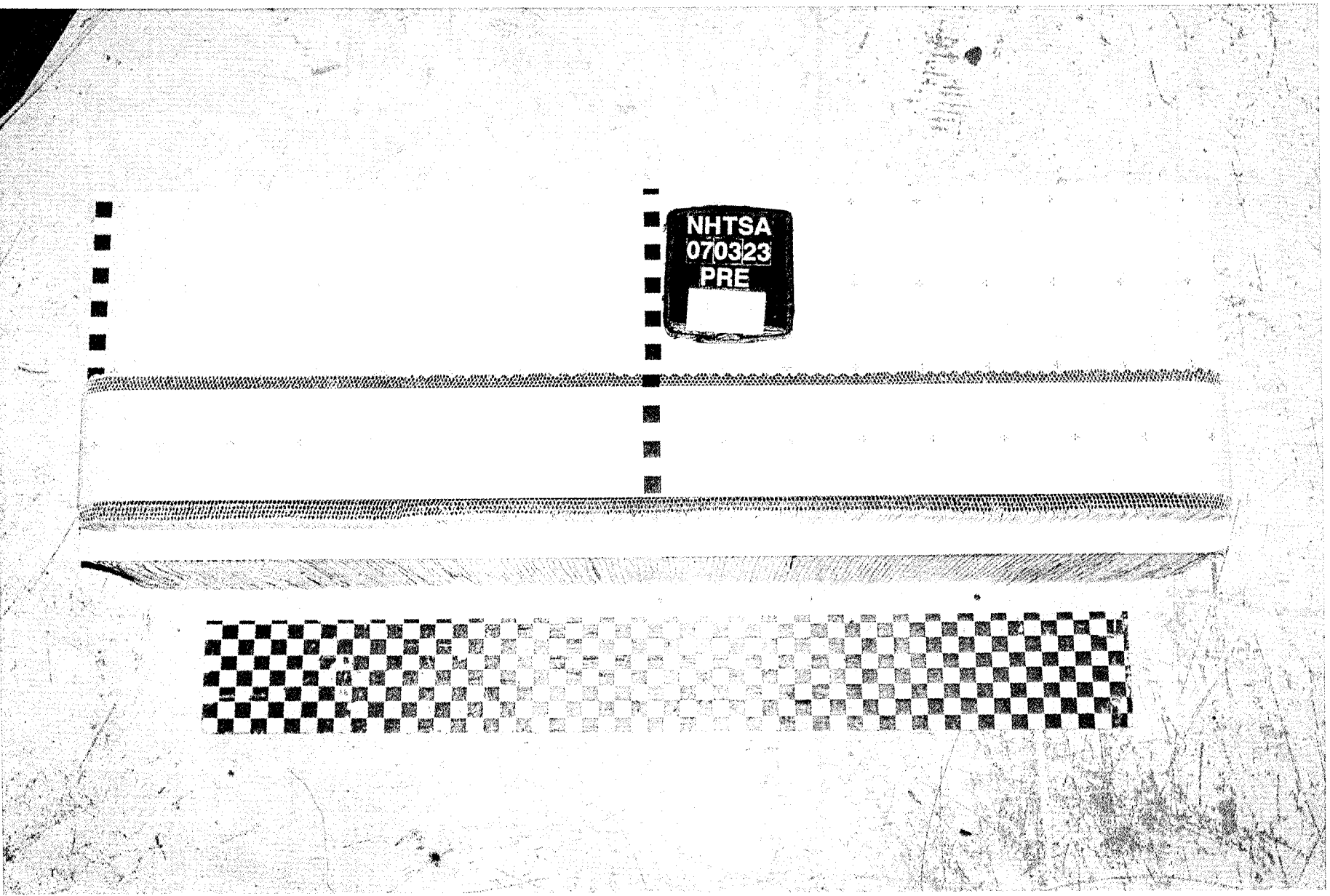


Figure A-17 Pre-Test Frontal View of Impactor Face

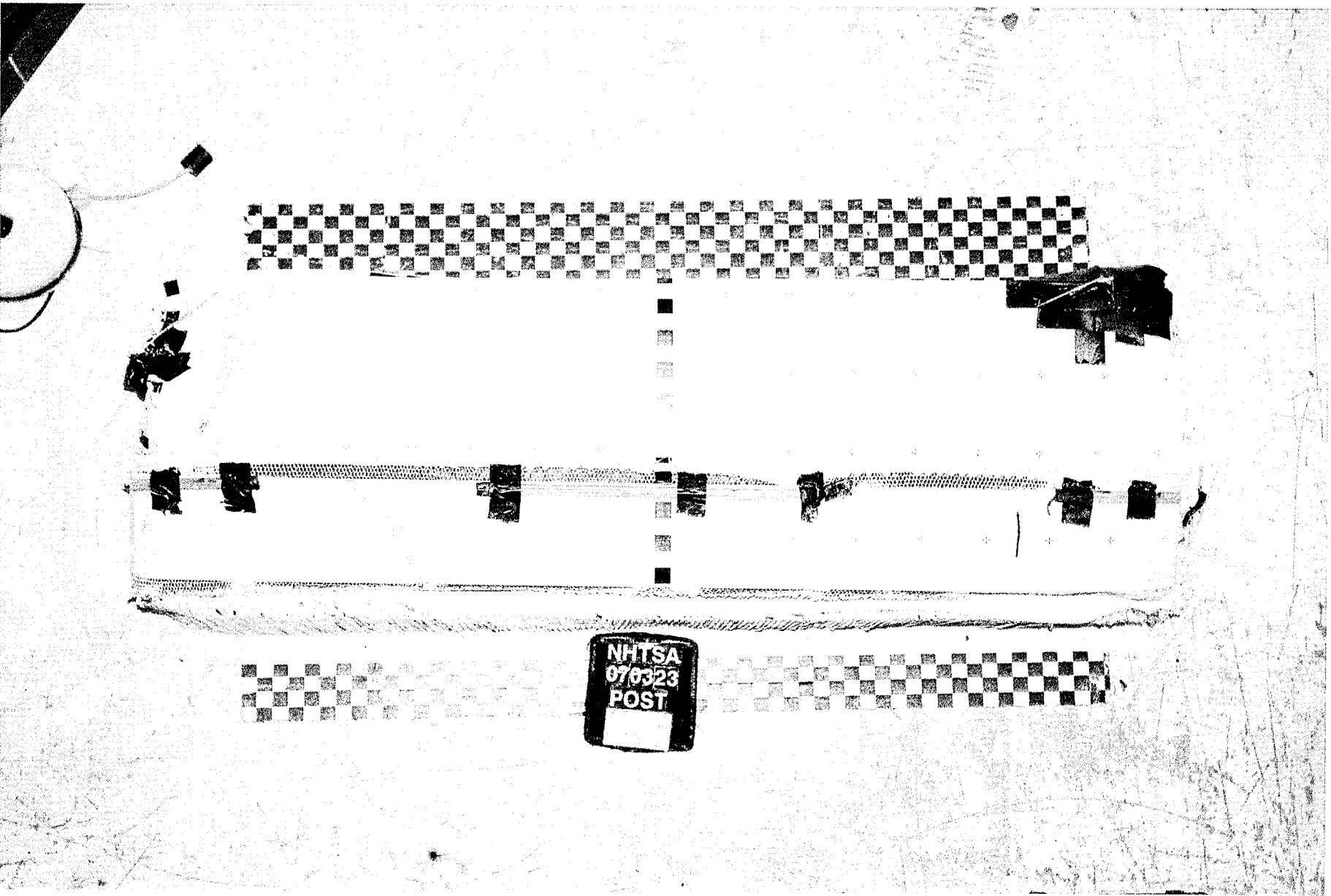


Figure A-18 Post-Test Frontal View of Impactor Face



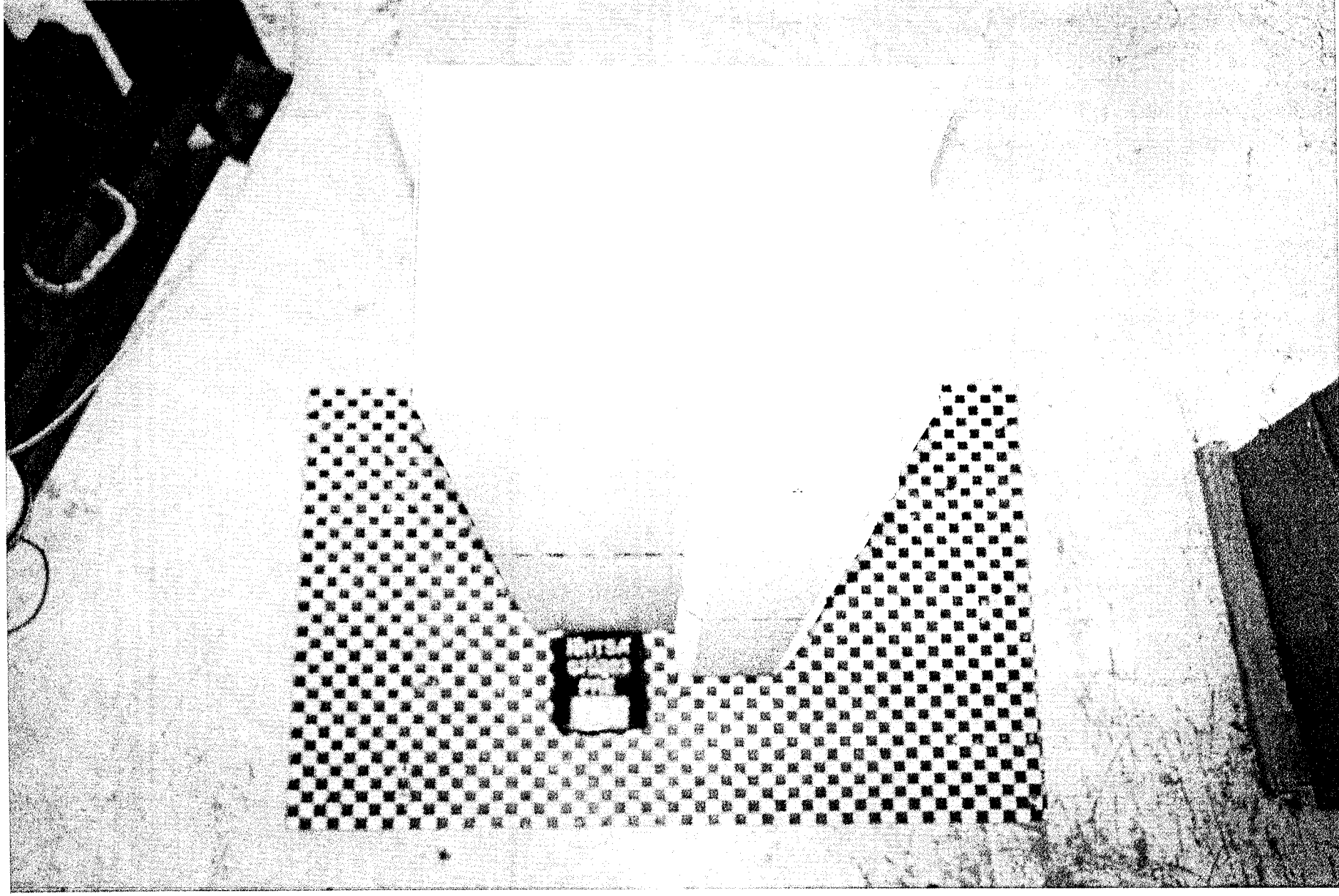


Figure A-19 Pre-Test Left Side View of Impactor Face

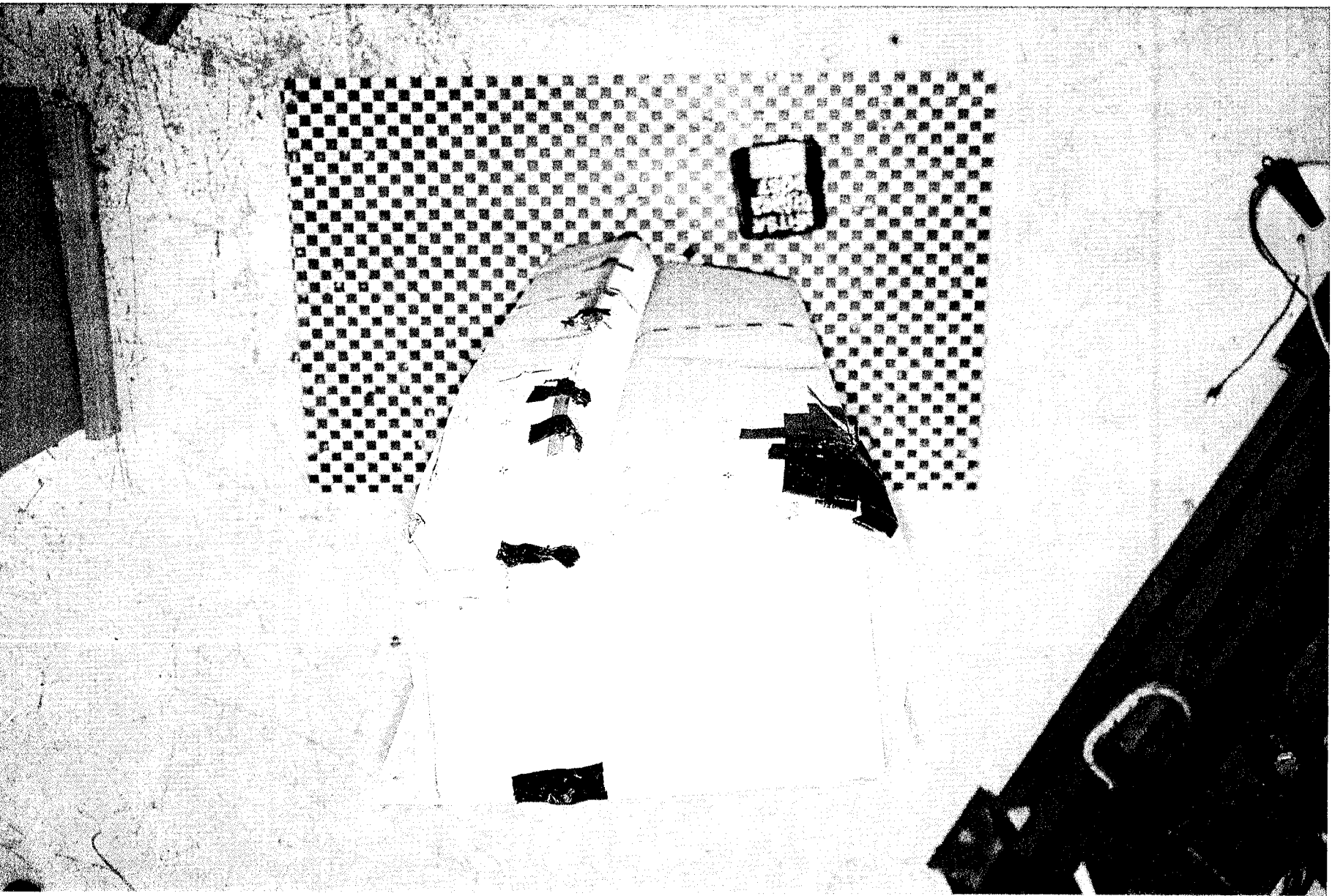
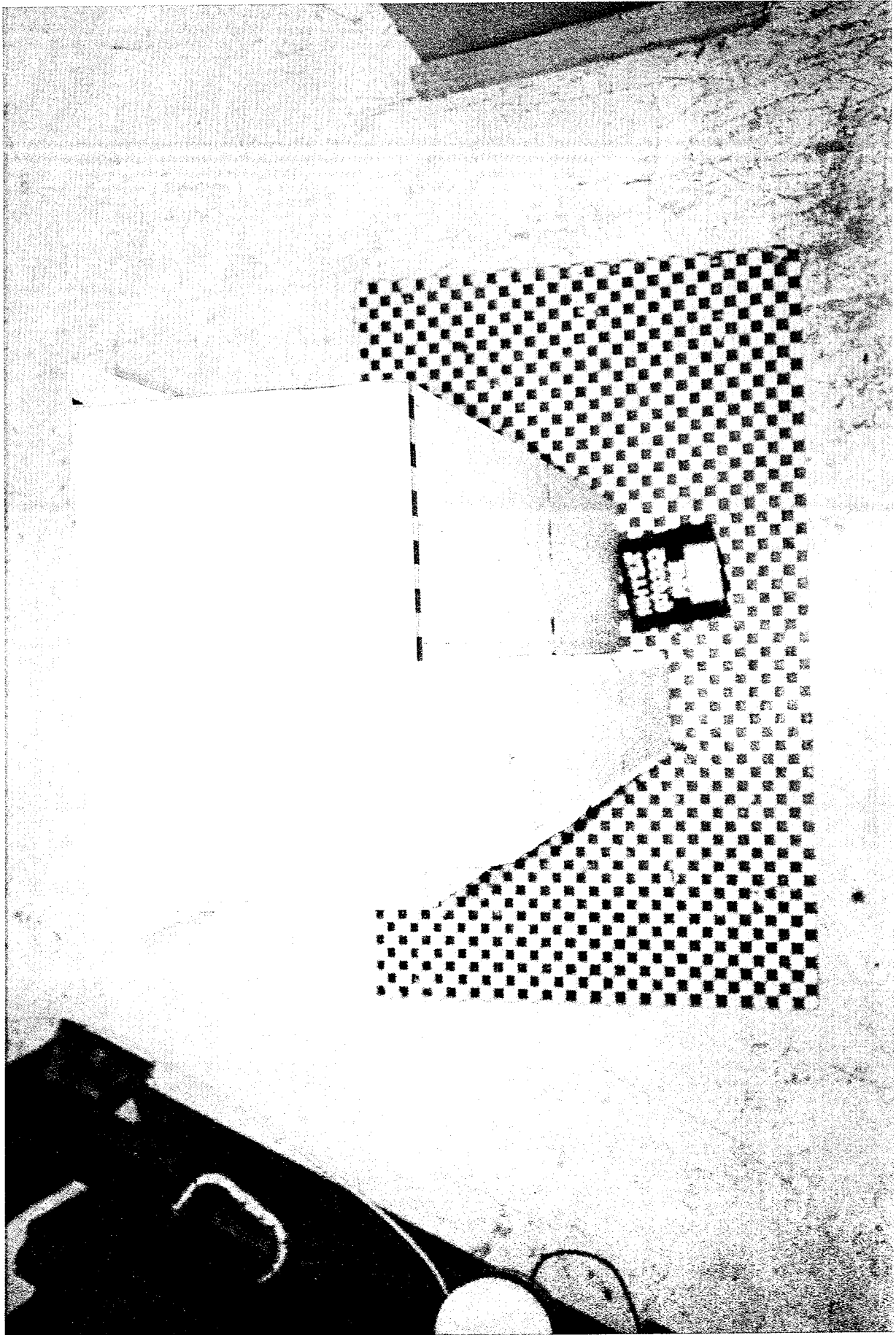
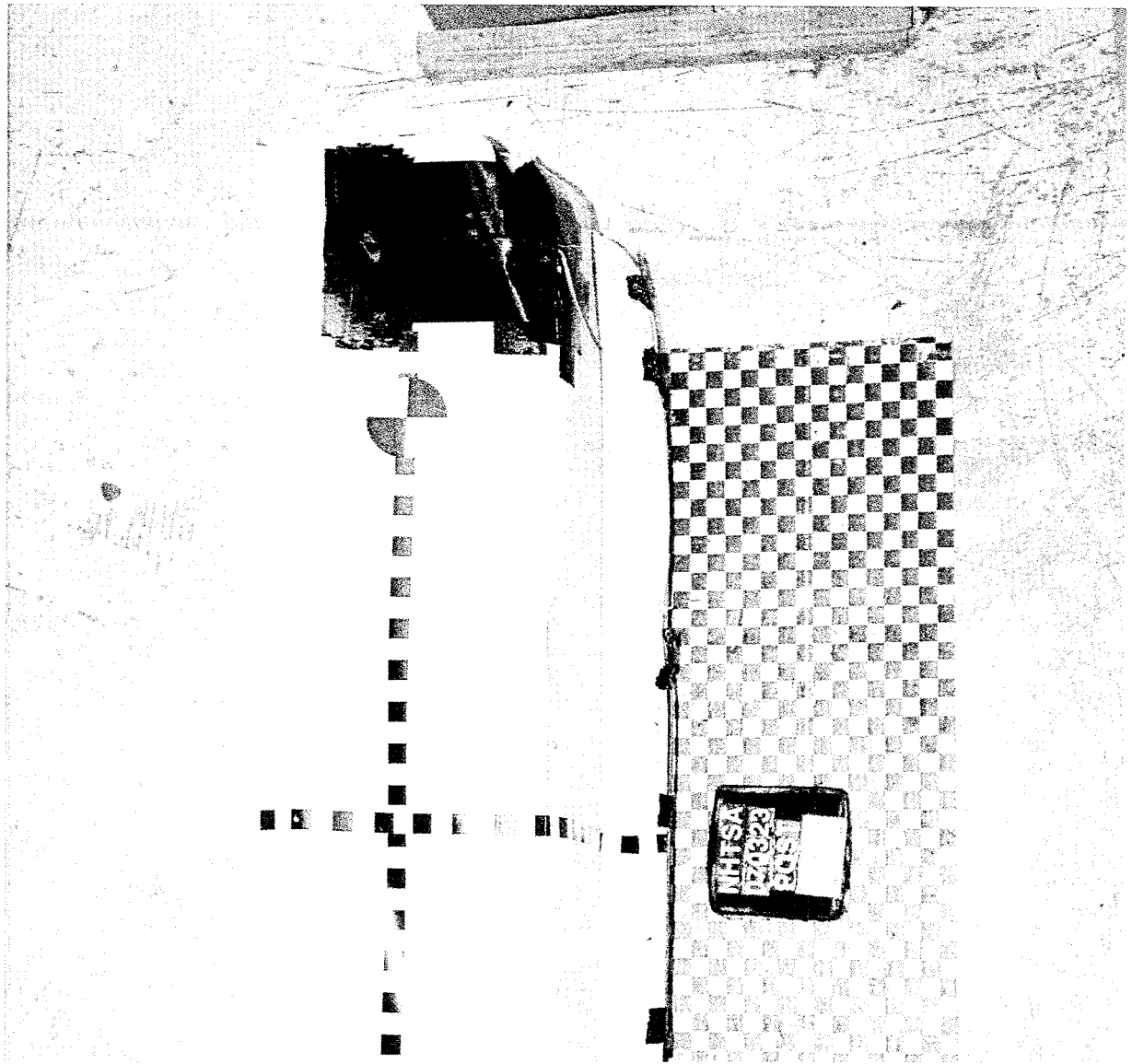


Figure A-20 Post-Test Left Side View of Impactor Face



**Figure A-21 Pre-Test Right Side View of Impactor Face**



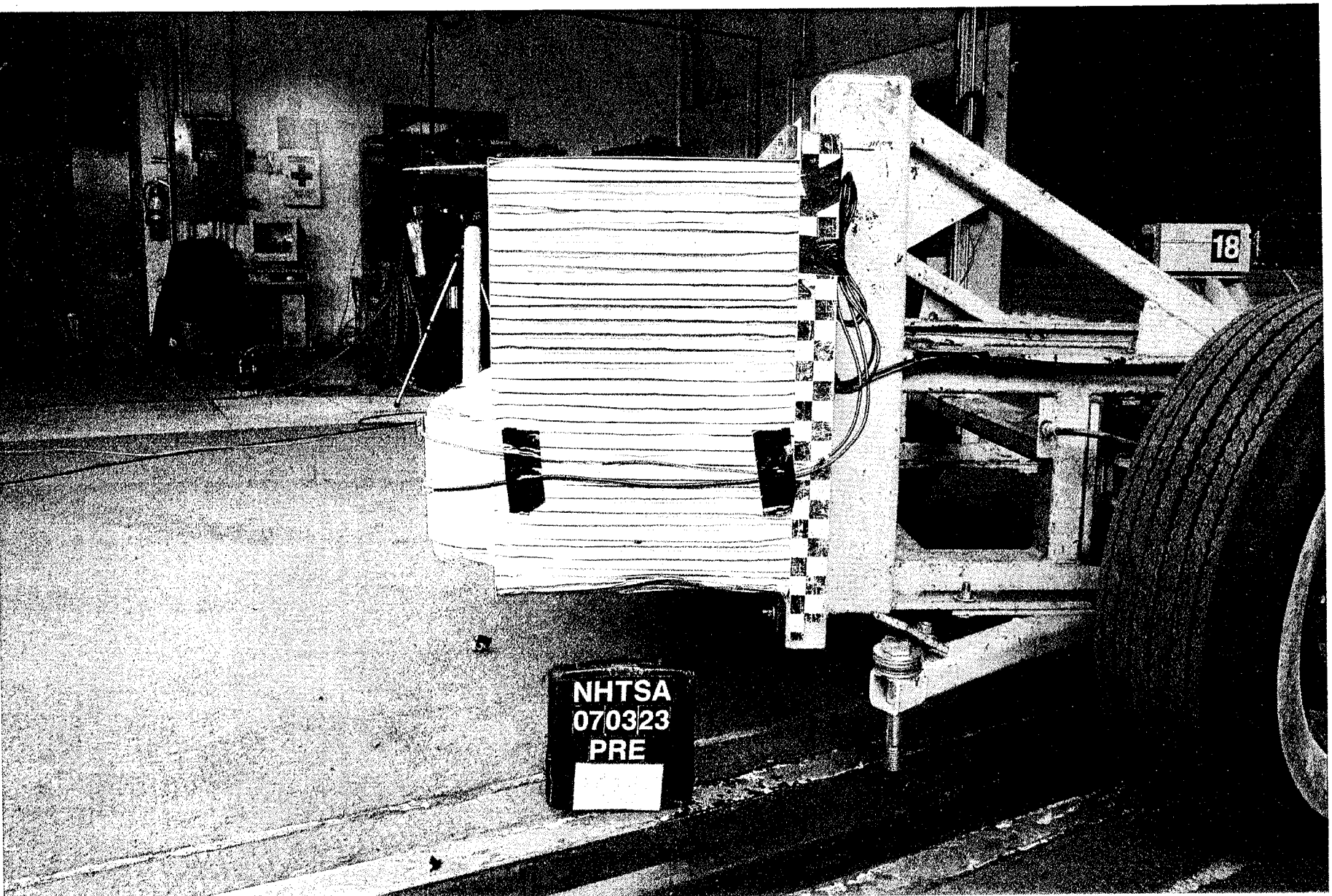


Figure A-25 Pre-Test Left Side View of Impactor

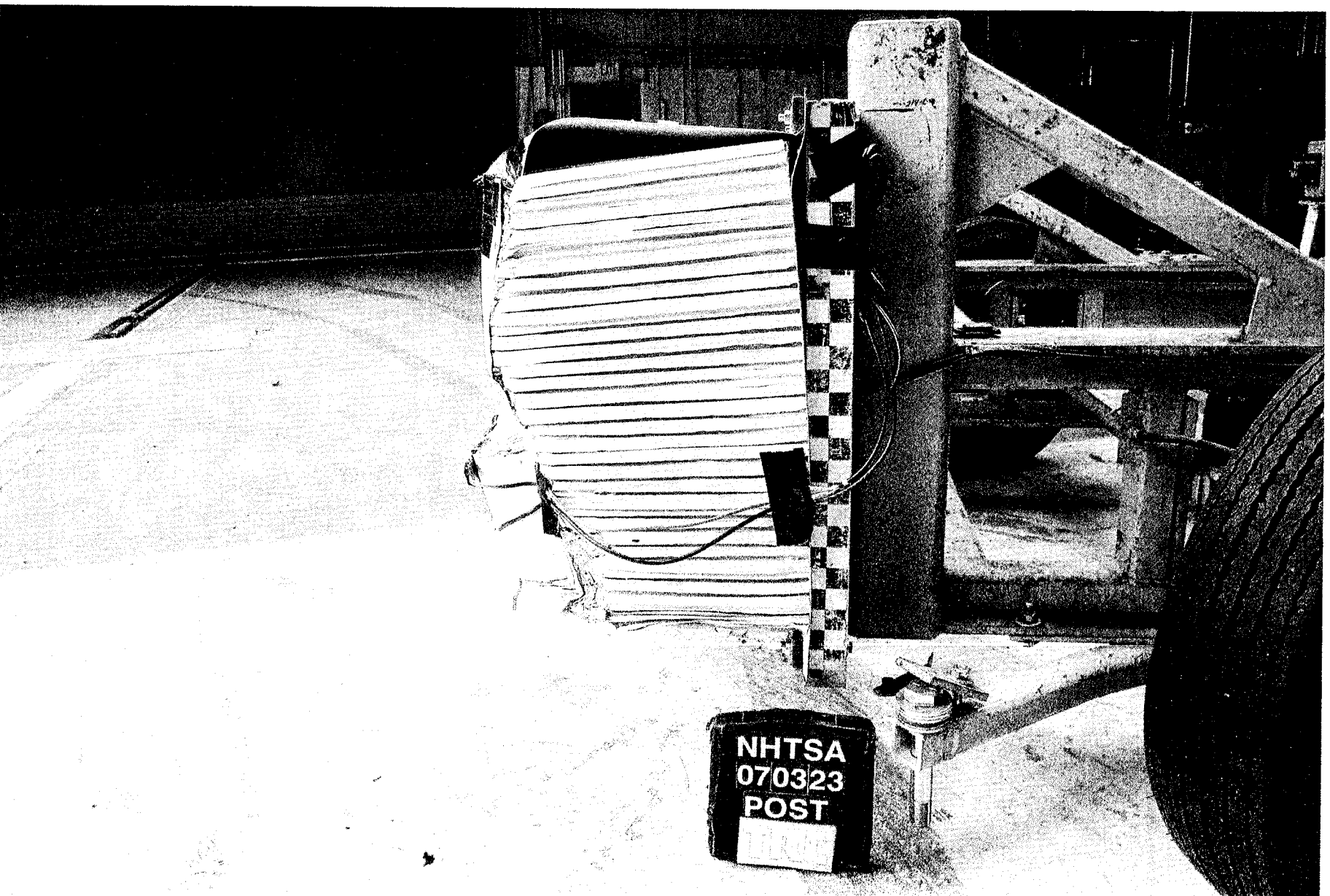


Figure A-26 Post-Test Left Side View of Impactor



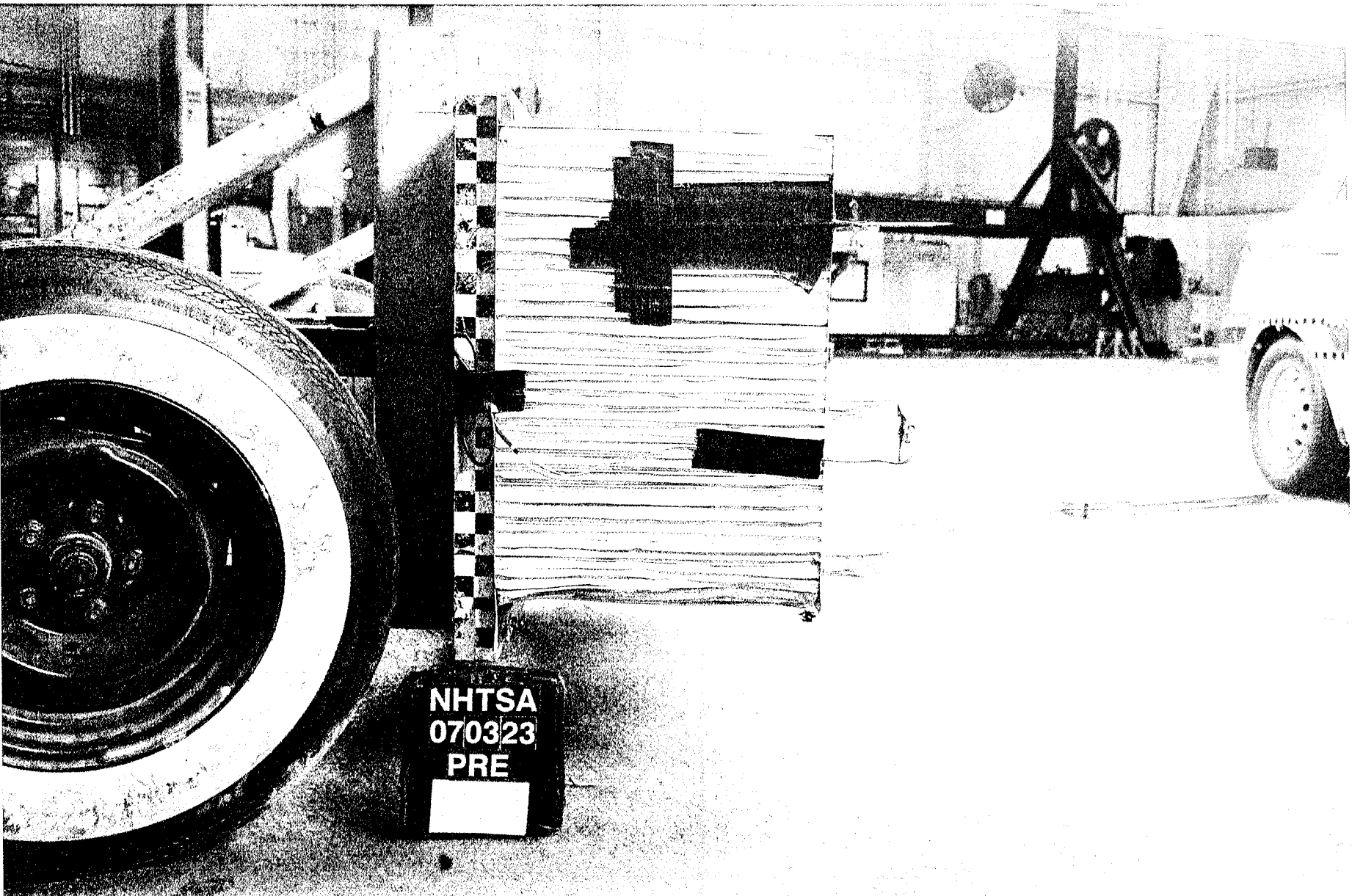


Figure A-27 Pre-Test Right Side View of Impactor

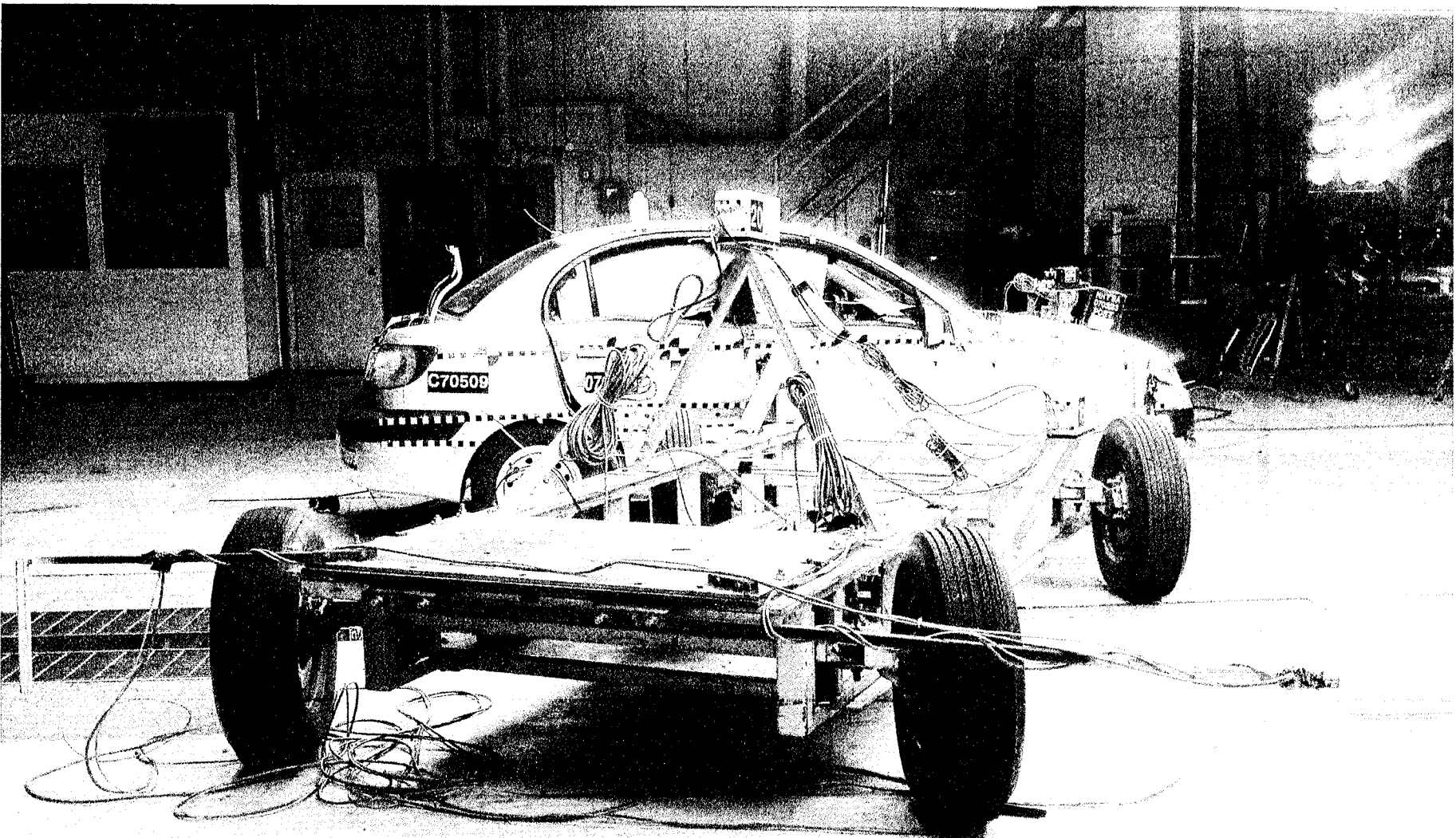


Figure A-34 Post-Test Rear Overall View of Impactor



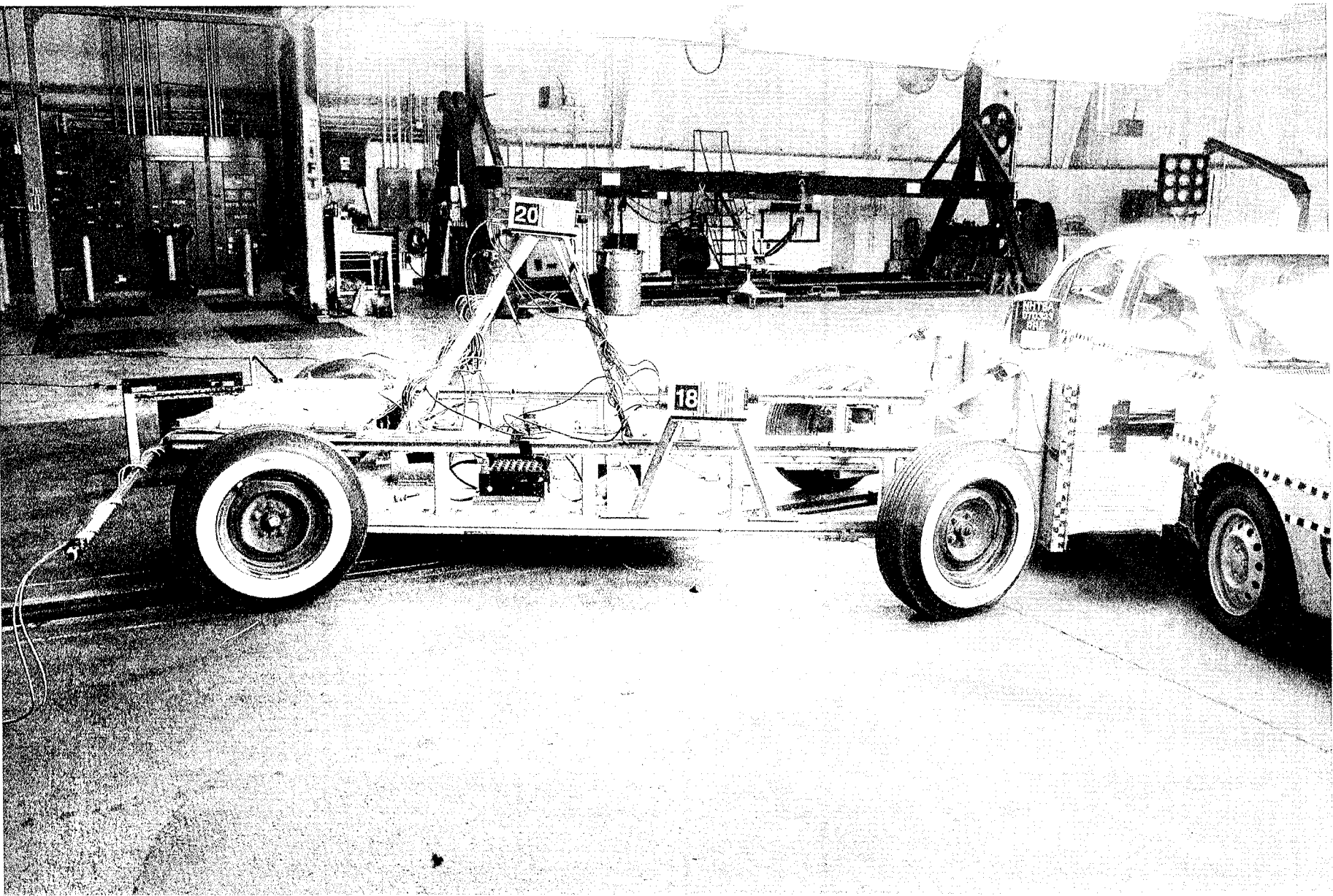


Figure A-35 Pre-Test Right Side Overall View of Impactor

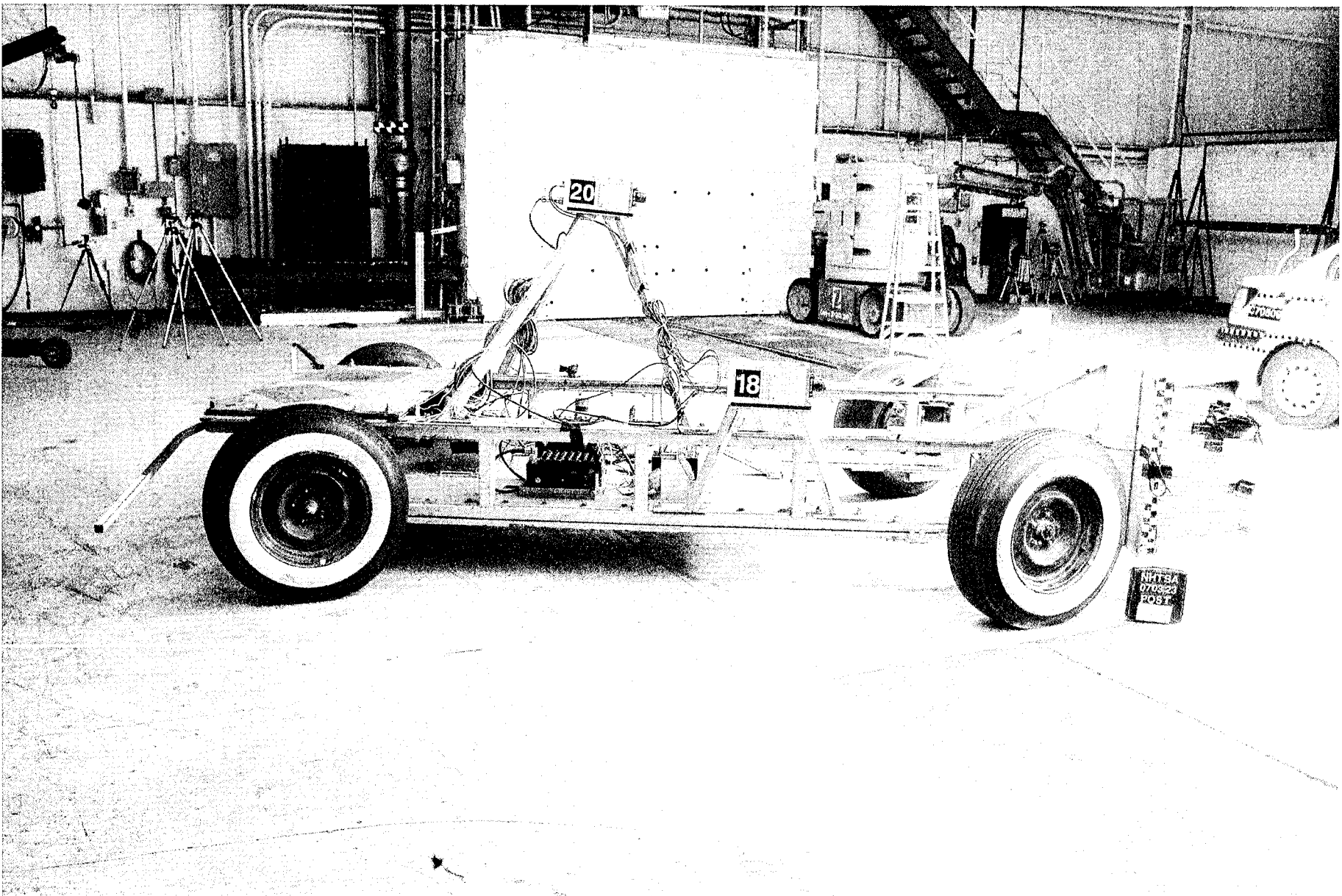


Figure A-36 Post-Test Right Side Overall View of Impactor

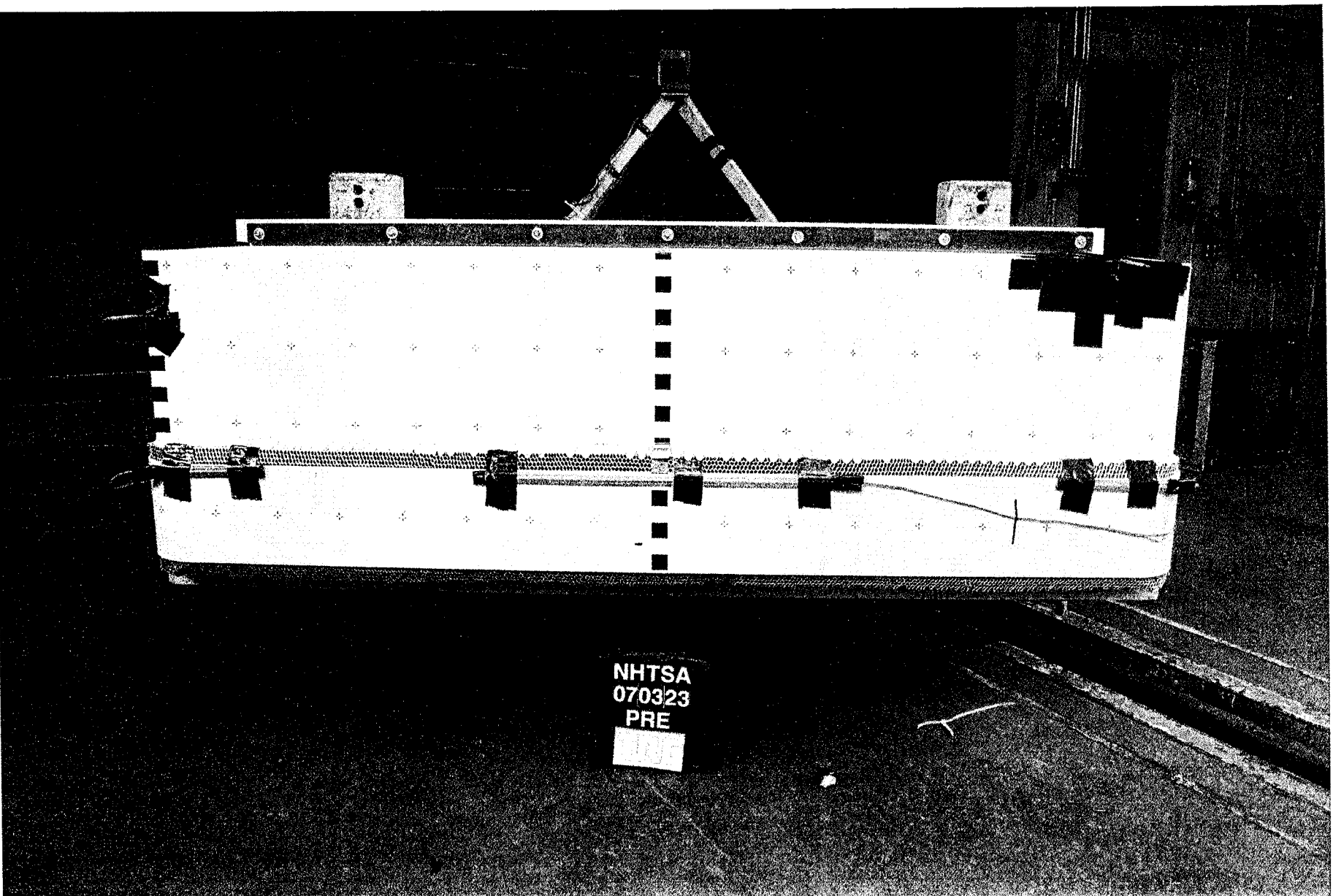


Figure A-37 Pre-Test View of MDB Showing Contact Switches in Place

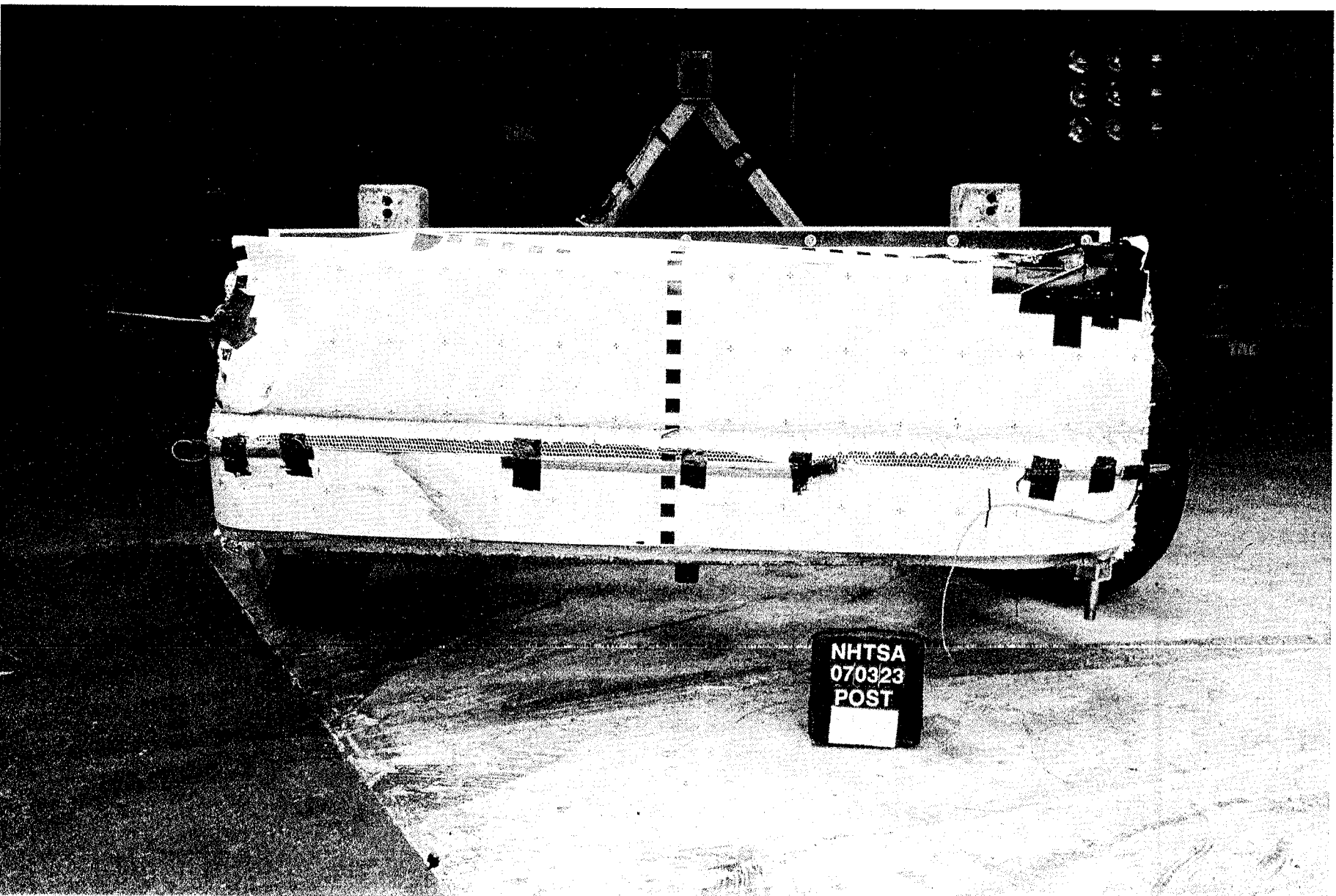


Figure A-38 Post-Test View of MDB Showing Contact Switches in Place

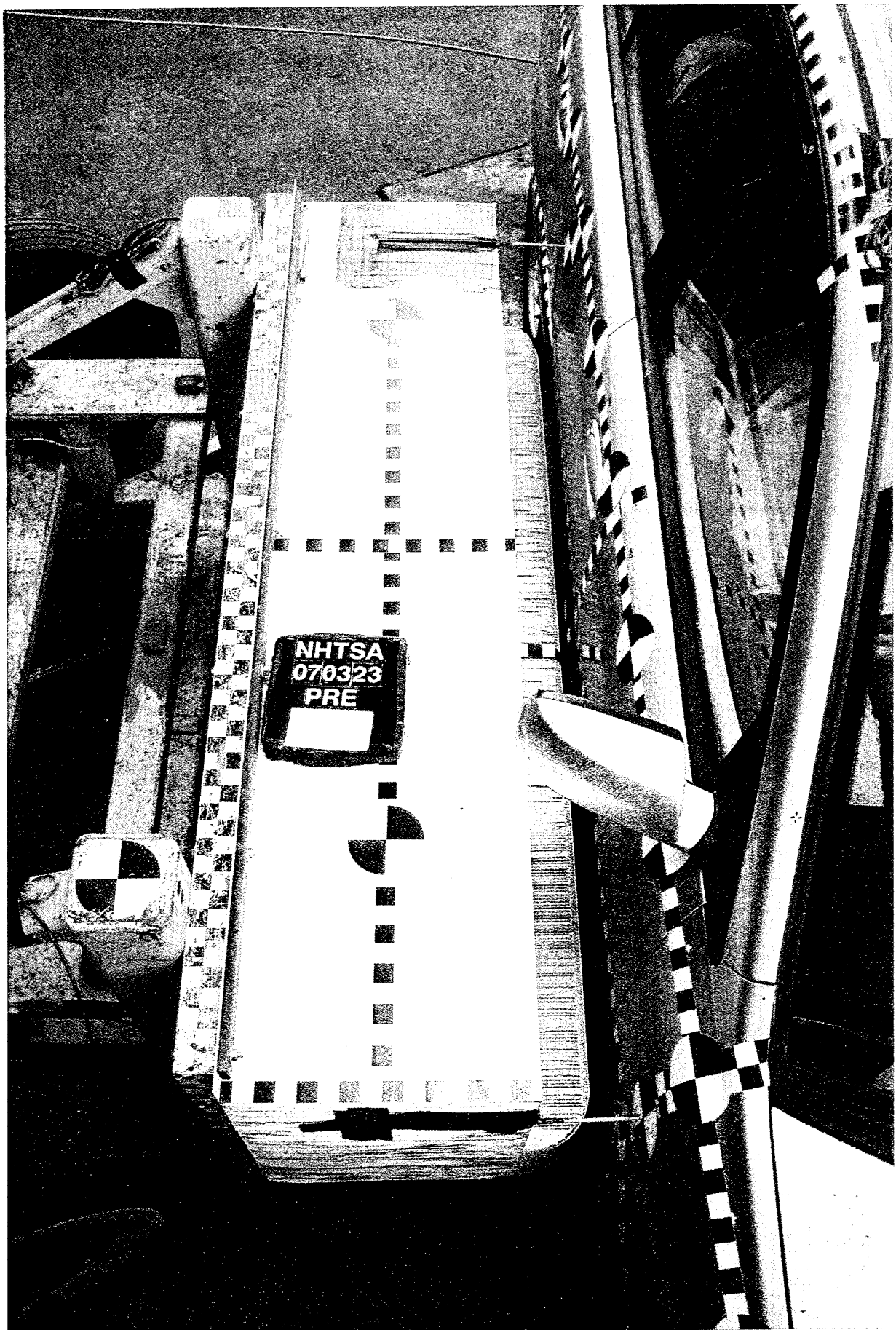


Figure A-39 Pre-Test Overhead View of MDB Aligned with Vehicle





Figure A-40 Post-Test Overhead View of MDB and Vehicle

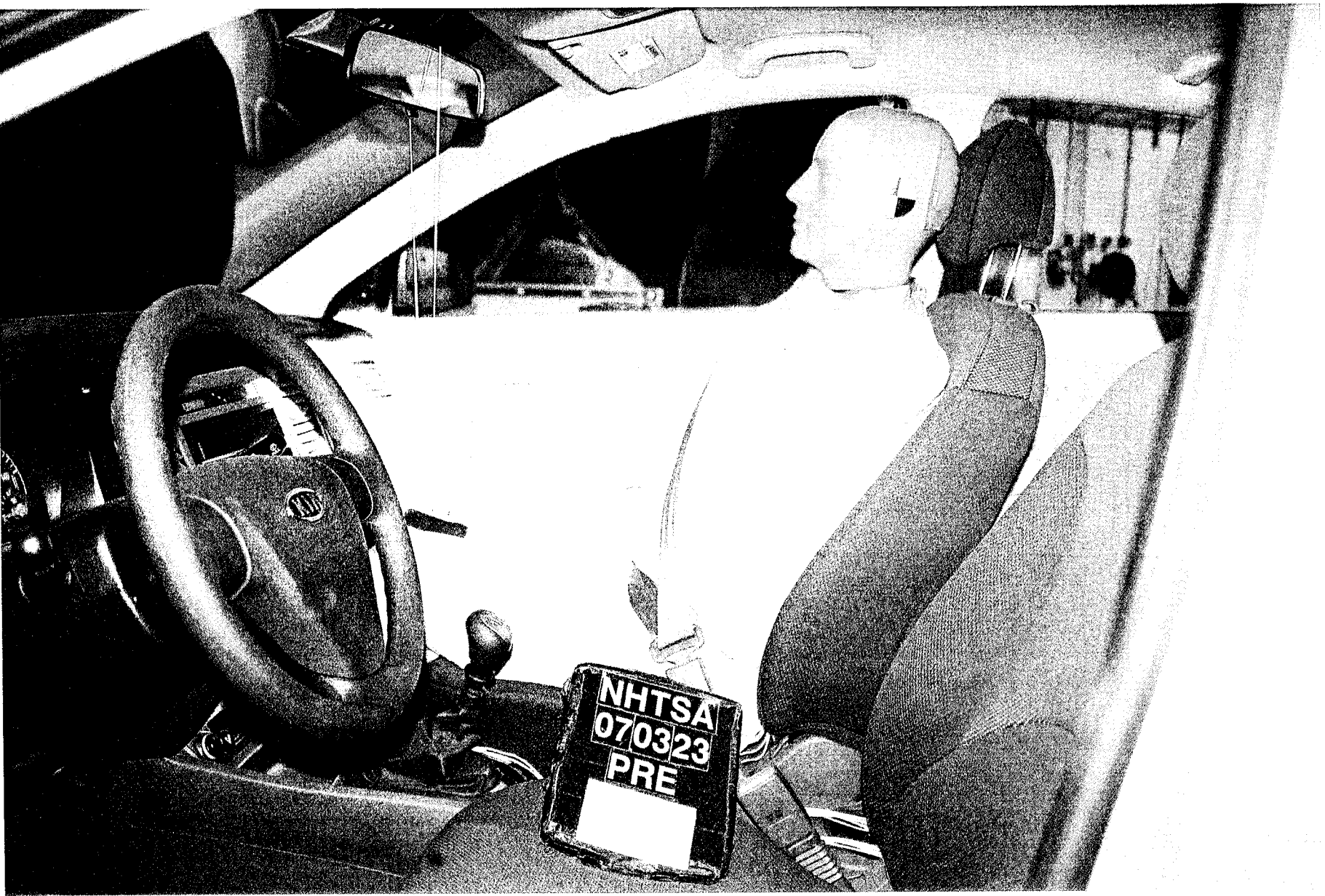


Figure A-41 Pre-Test Left Occupant Compartment View of Front SID



**Figure A-42 Post-Test Left Occupant Compartment View of Front SID**



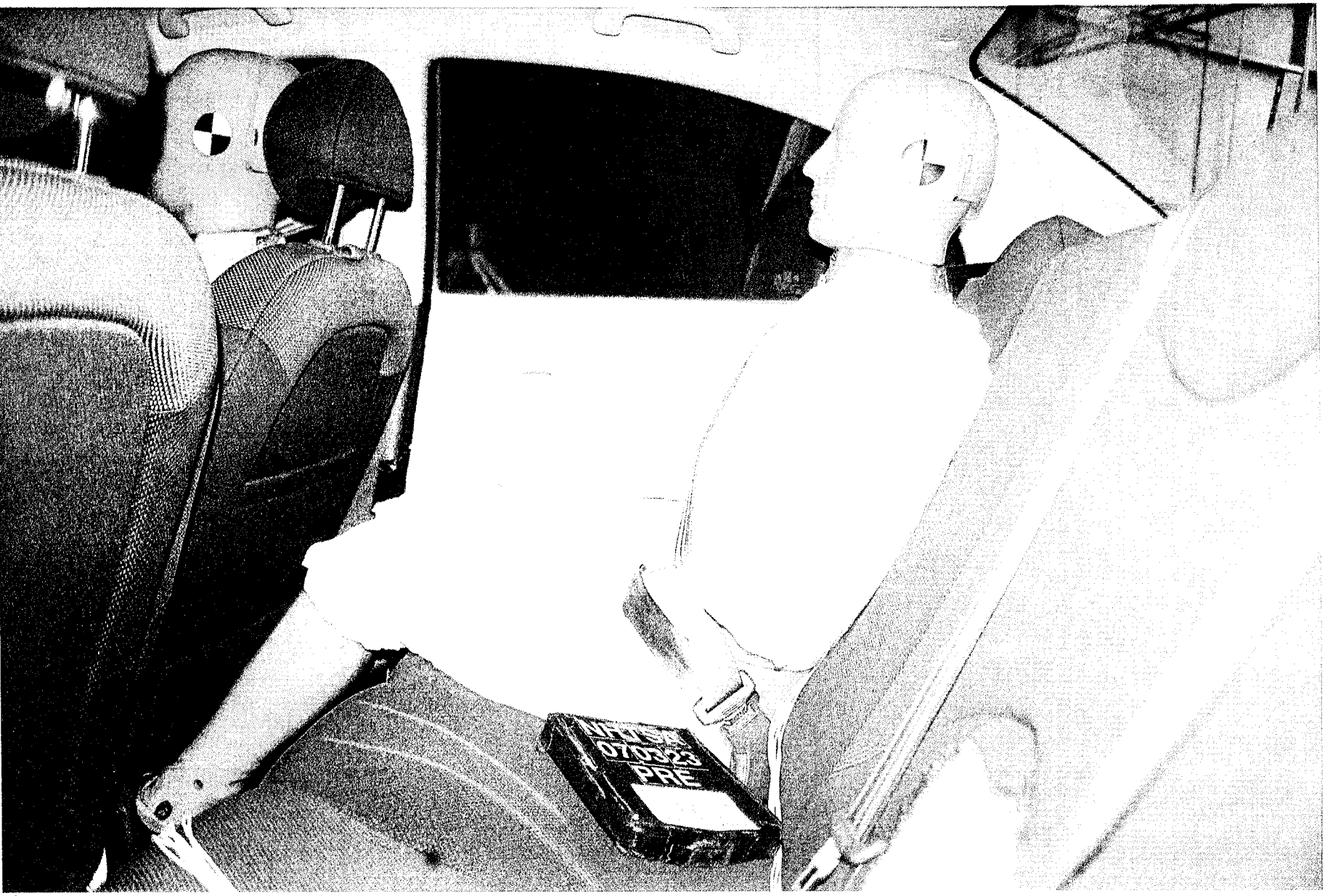


Figure A-43 Pre-Test Left Occupant Compartment View of Rear SID



Figure A-44 Post-Test Left Occupant Compartment View of Rear SID

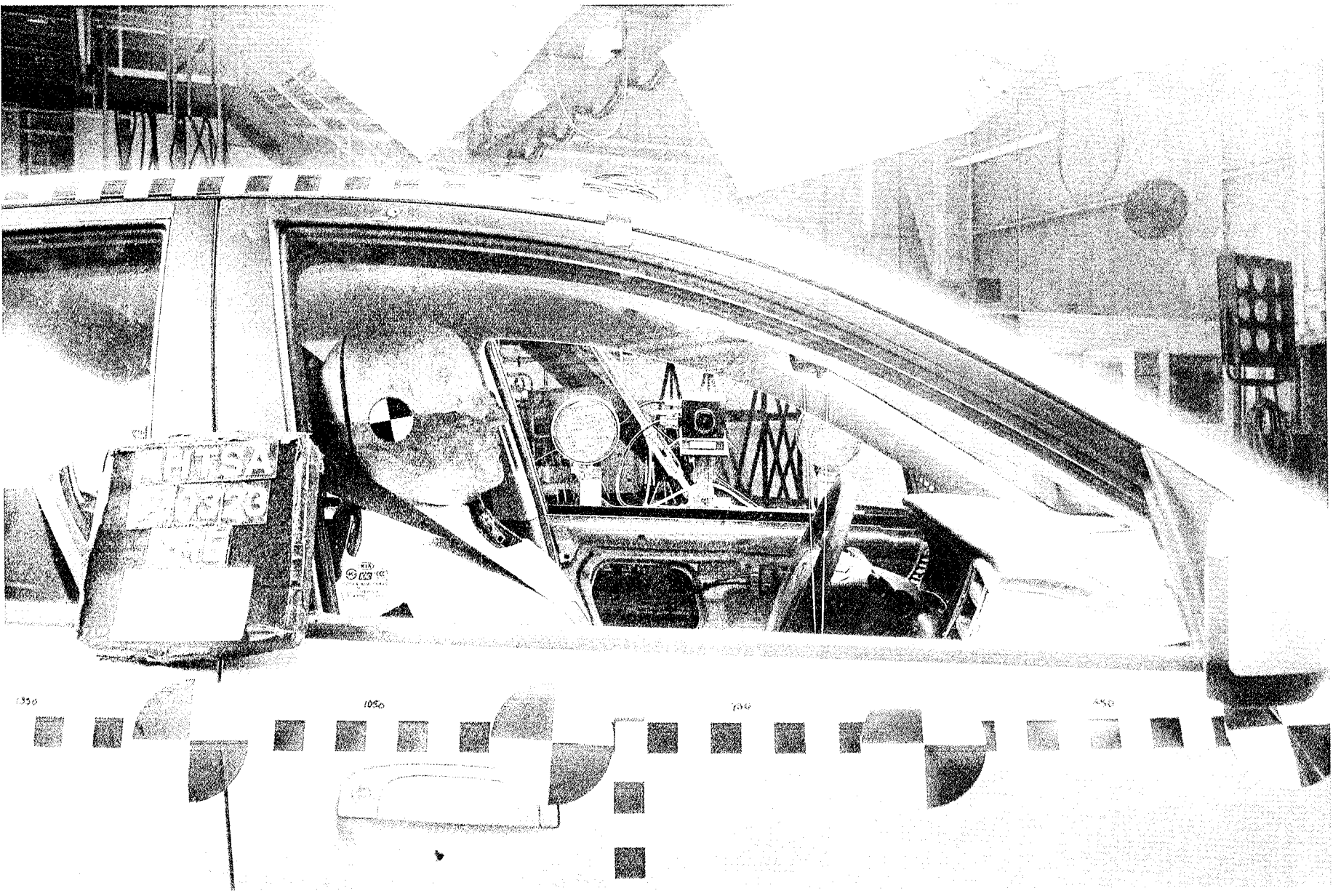


Figure A-45 Pre-Test Right View of Front SID



Figure A-46 Post-Test Right View of Front SID



Figure A-47 Pre-Test Right View of Front SID and Belt Position





Figure A-50 Pre-Test Right View of Rear SID



Figure A-51 Post-Test Right View of Rear SID

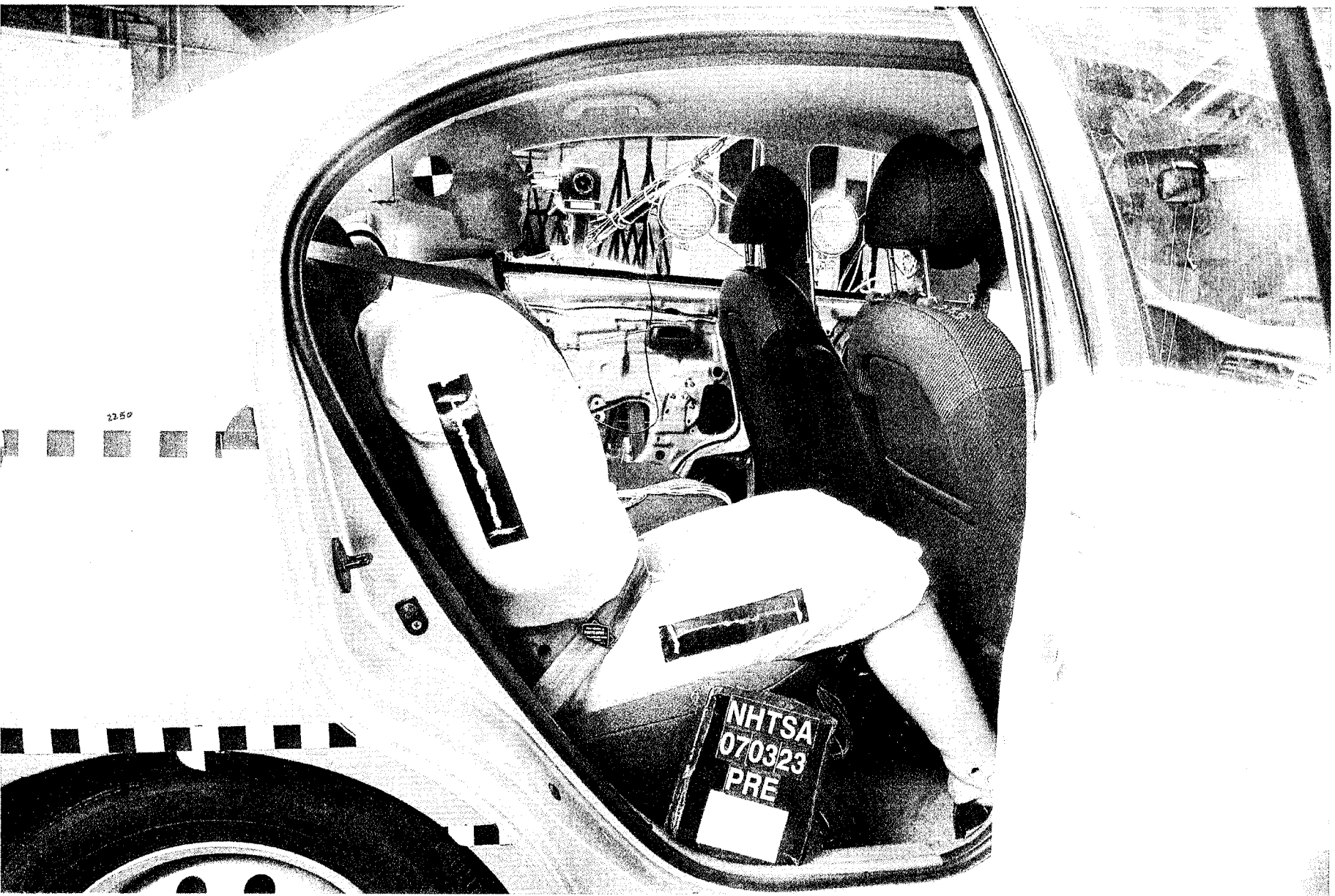
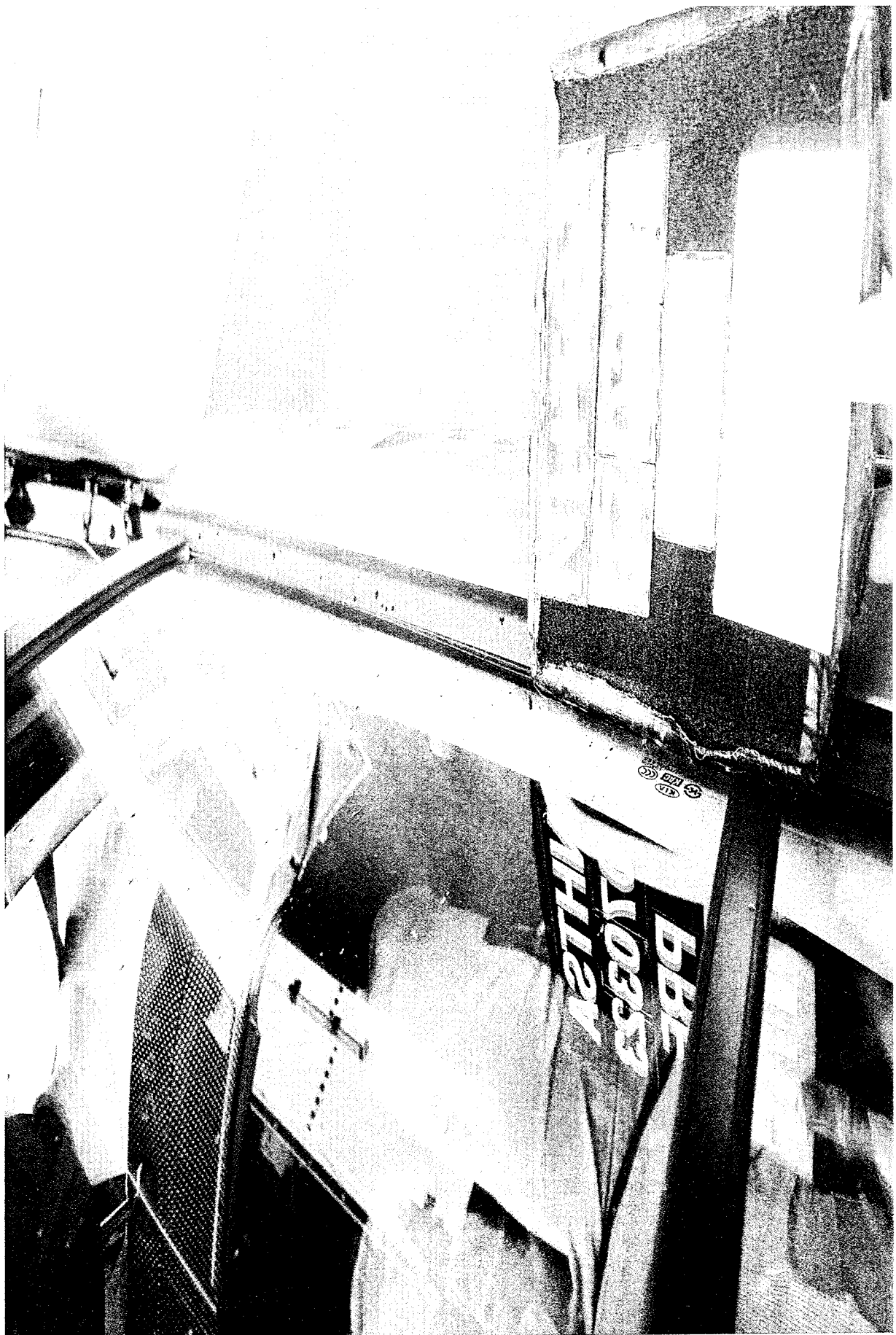


Figure A-52 Pre-Test Right of Rear SID and Belt Position





**Figure A-53 Pre-Test Right View of Rear SID and Door Clearance**



**Figure A-54 Post-Test Right View of Rear SID and Door Clearance**

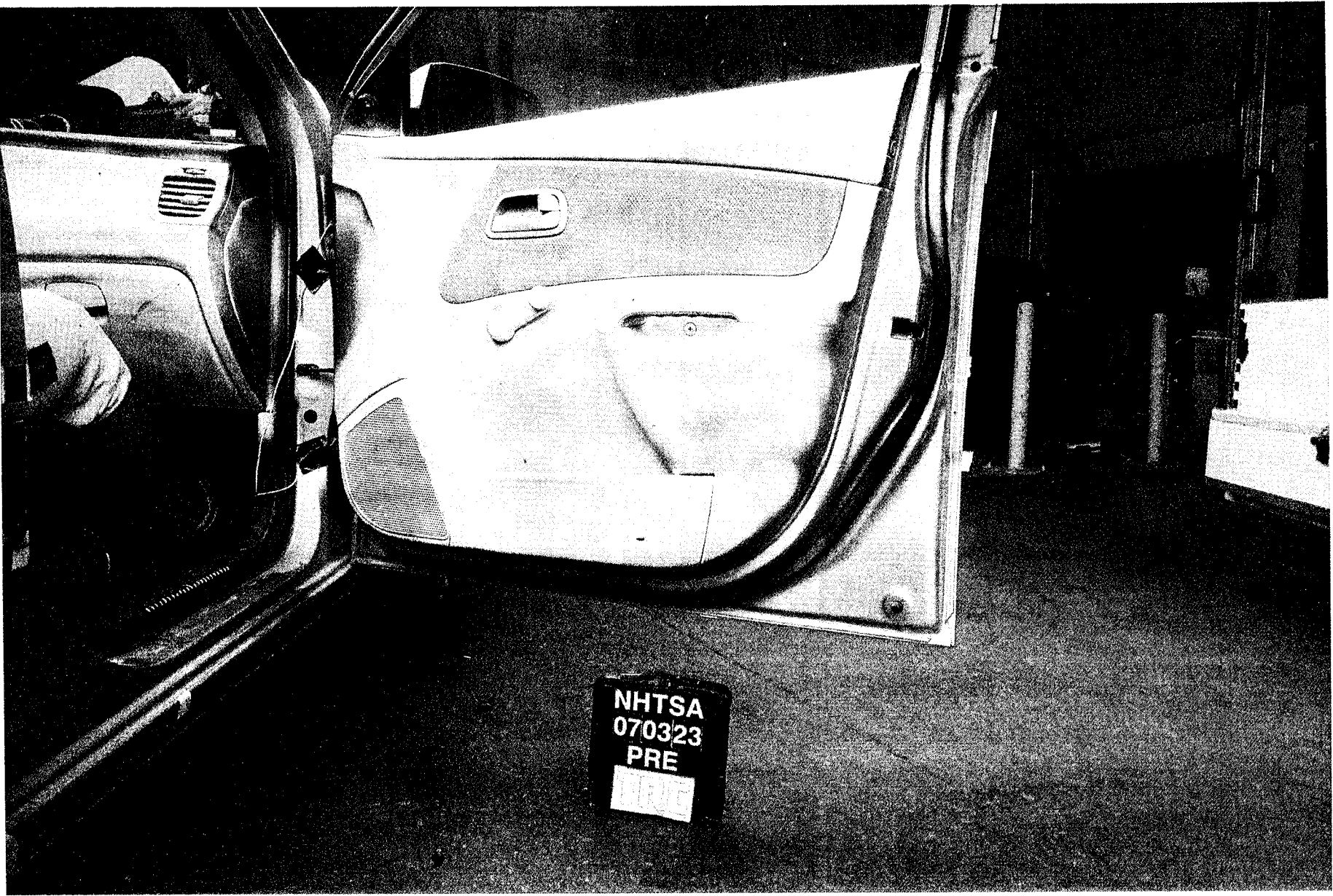


Figure A-55 Pre-Test Interior of Front Door



Figure A-56 Post-Test Interior of Front Door Showing SID Impact Locations



Figure A-57 Post-Test Front SID Contact - View 1



Figure A-58 Post-Test Front SID Contact - View 2





Figure A-59 Post-Test Front SID Contact - View 3



Figure A-60 Pre-Test Interior of Rear Panel



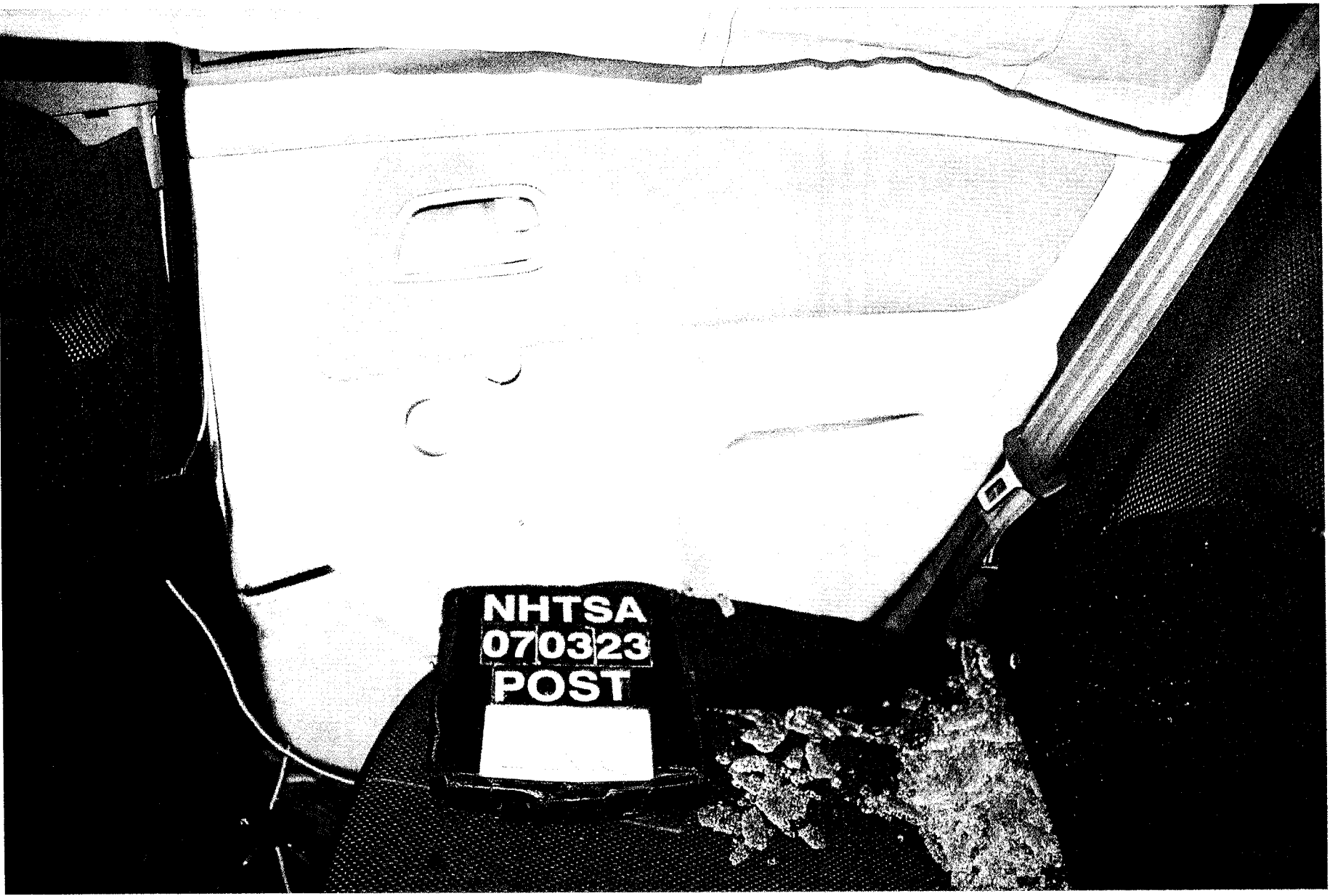


Figure A-61 Post-Test Interior of Rear Panel Showing SID Impact Locations



Figure A-62 Post-Test Rear SID Contact - View 1



Figure A-63 Post-Test Rear SLD Contact - View 2

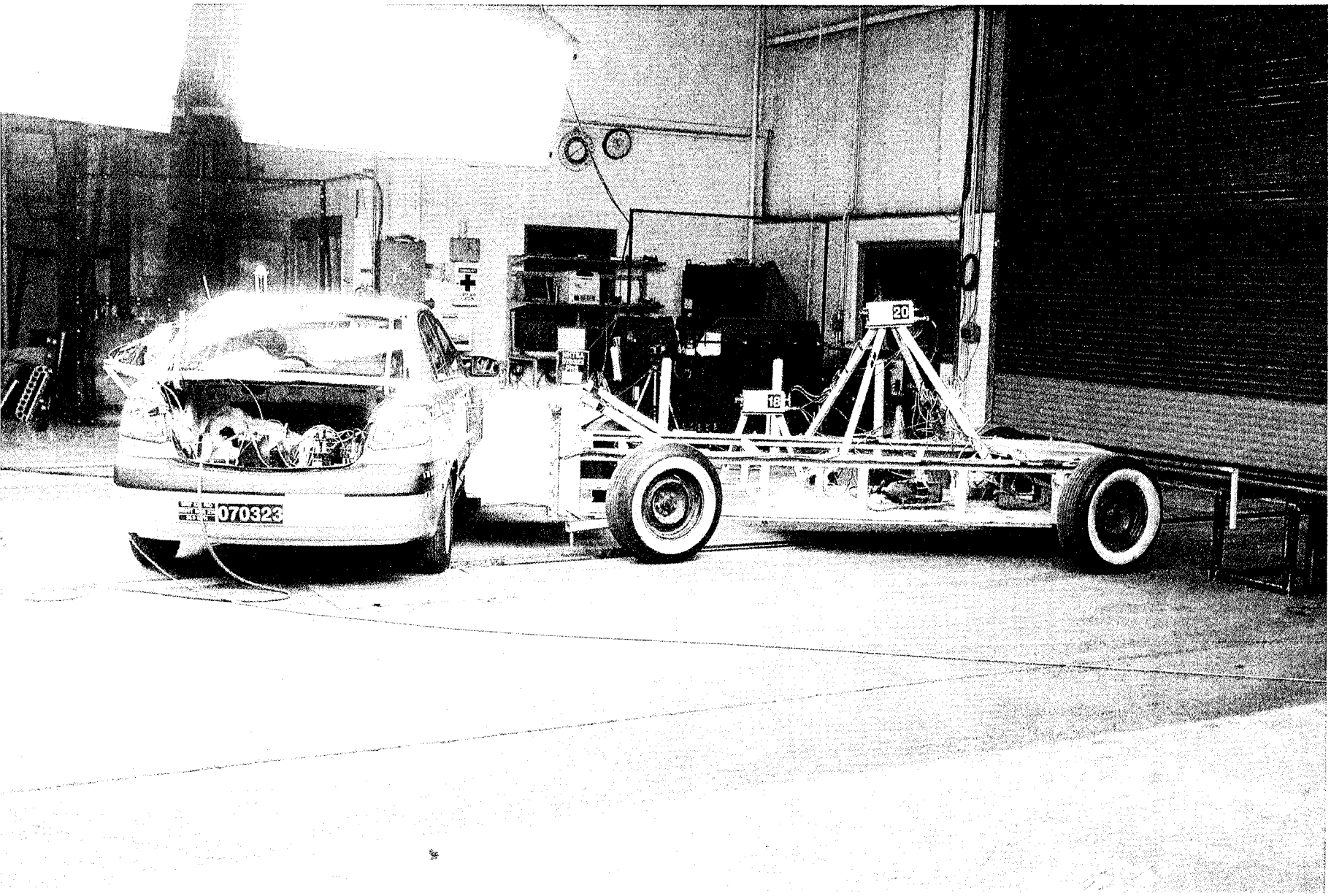


Figure A-64 Pre-Test Left Side View of MDB With Impactor Face in Position

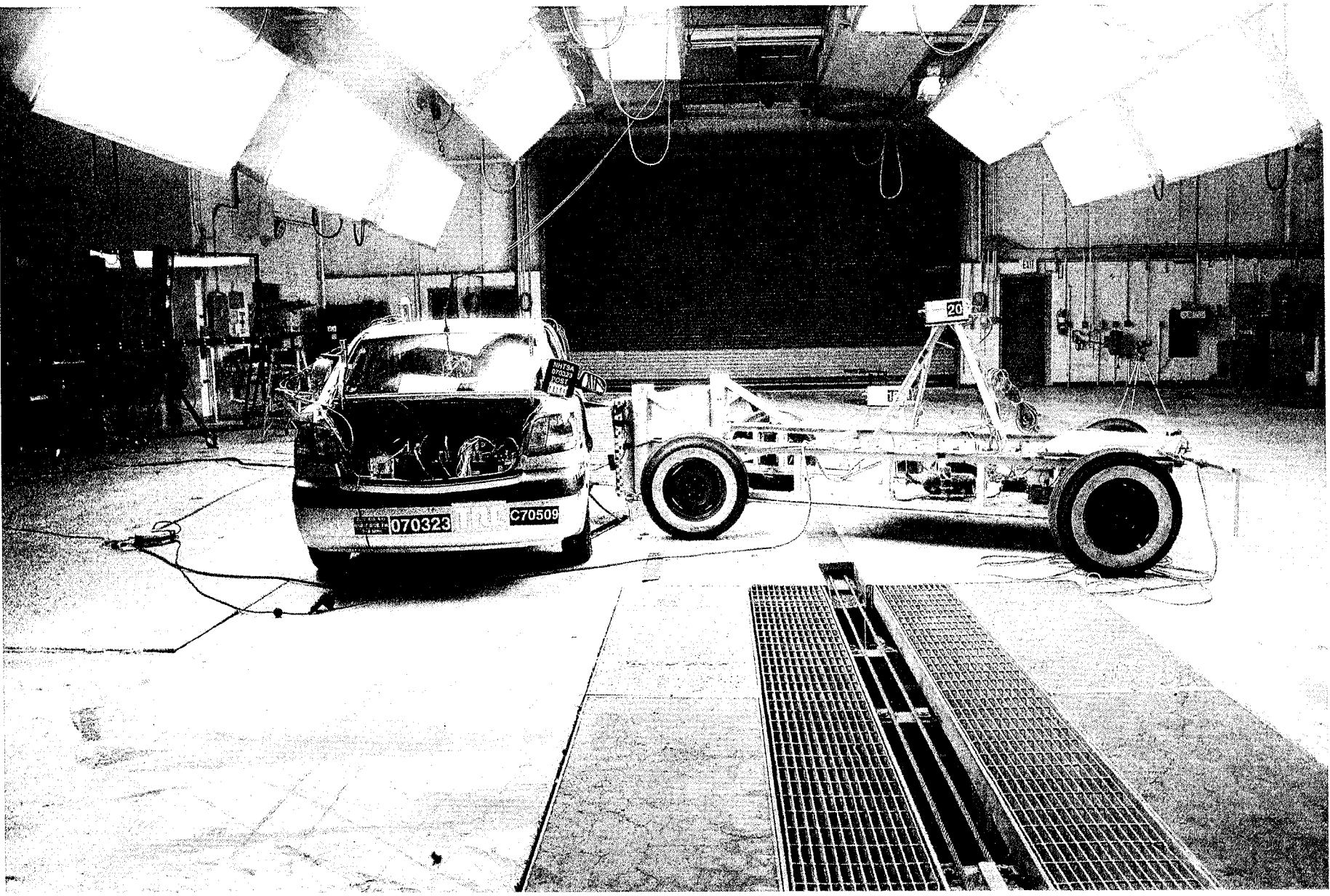


Figure A-65 Post-Test Left Side View of MDB With Impactor Face in Position



Figure A-66 Pre-Test Primary Impact Point View





Figure A-67 Post-Test Primary Impact Point View

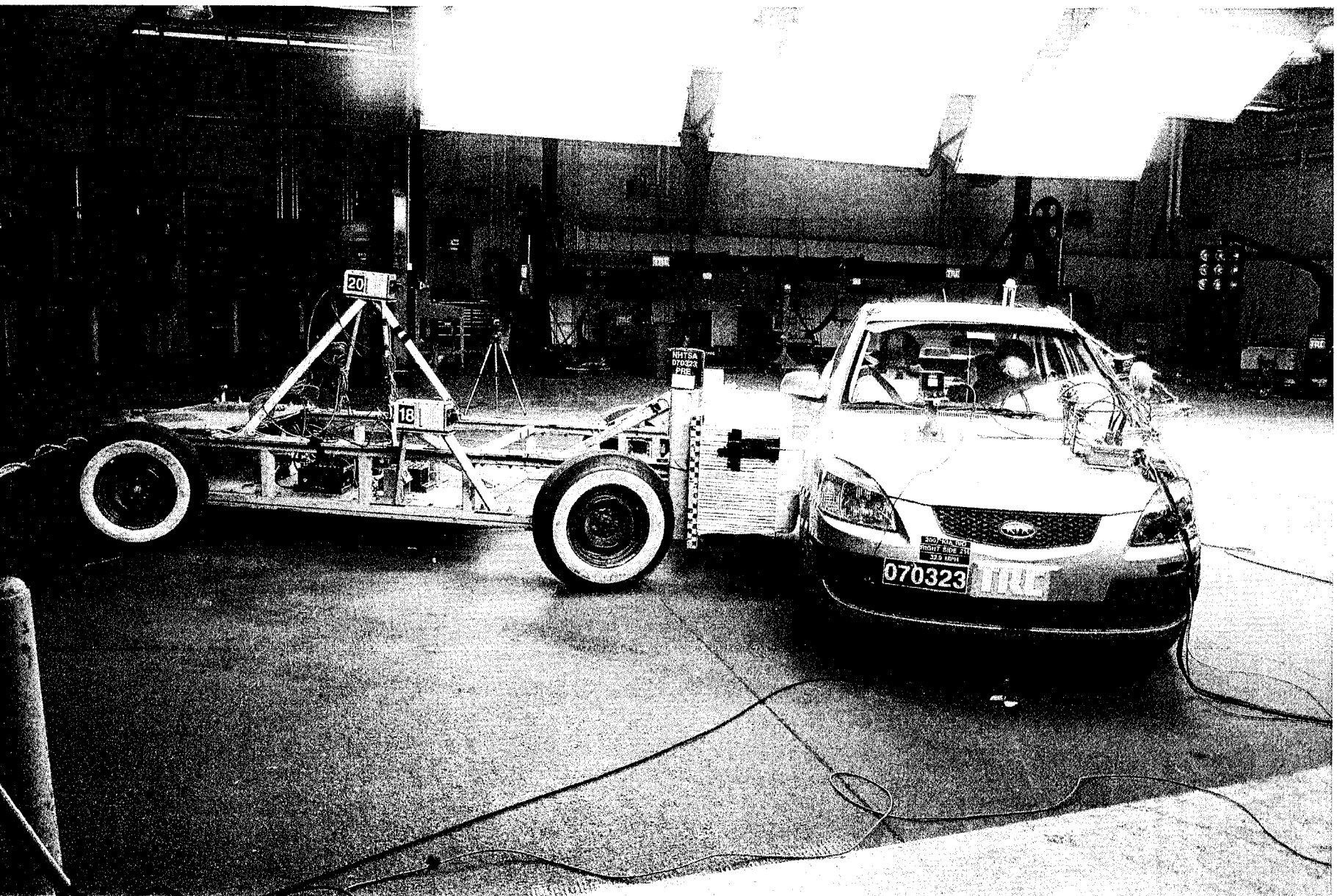


Figure A-68 Pre-Test Right Side View of MDB With Impactor Face in Position



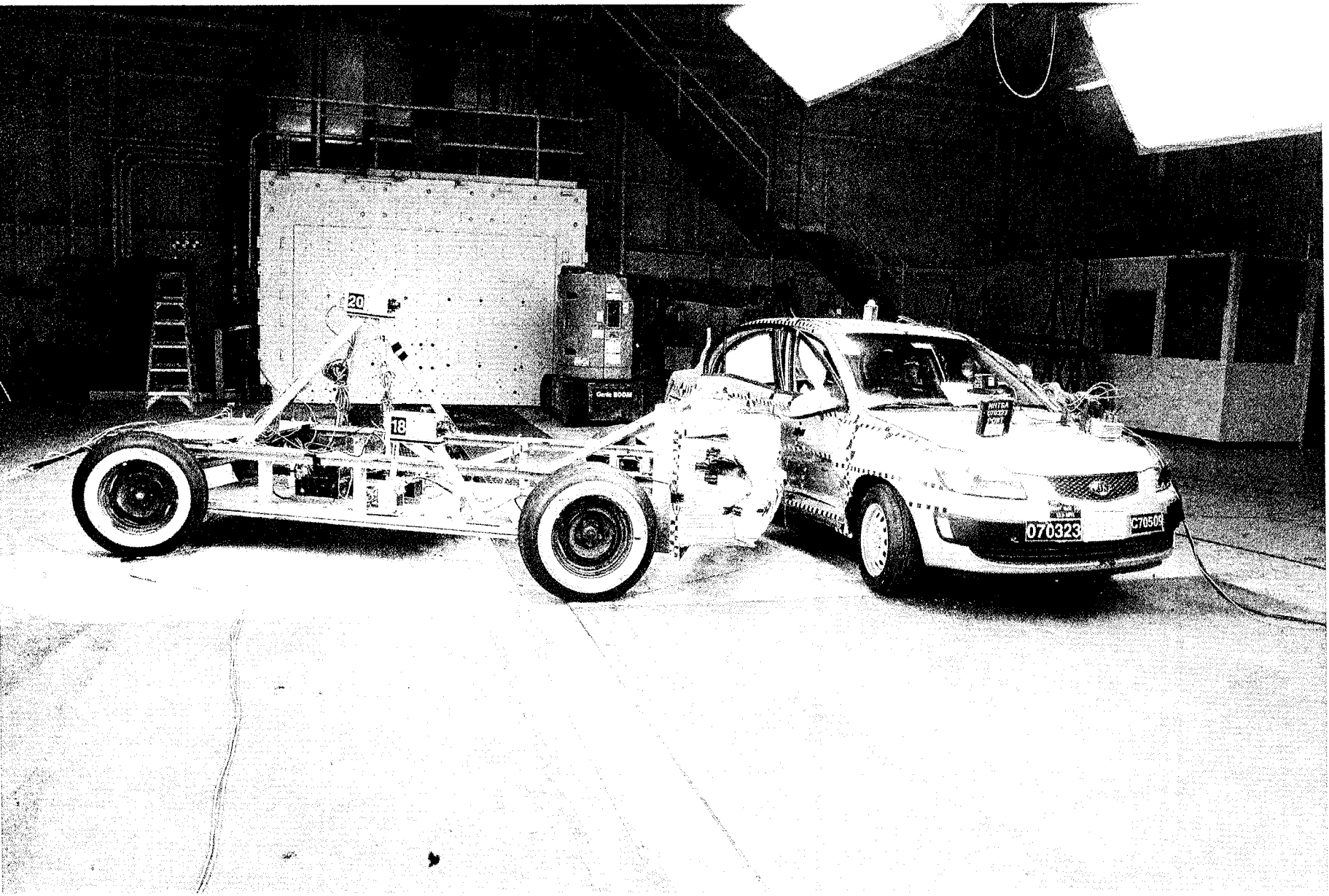


Figure A-69 Post-Test Right Side View of MDB With Impactor Face in Position



Figure A-70 Pre-Test Secondary Impact Point View

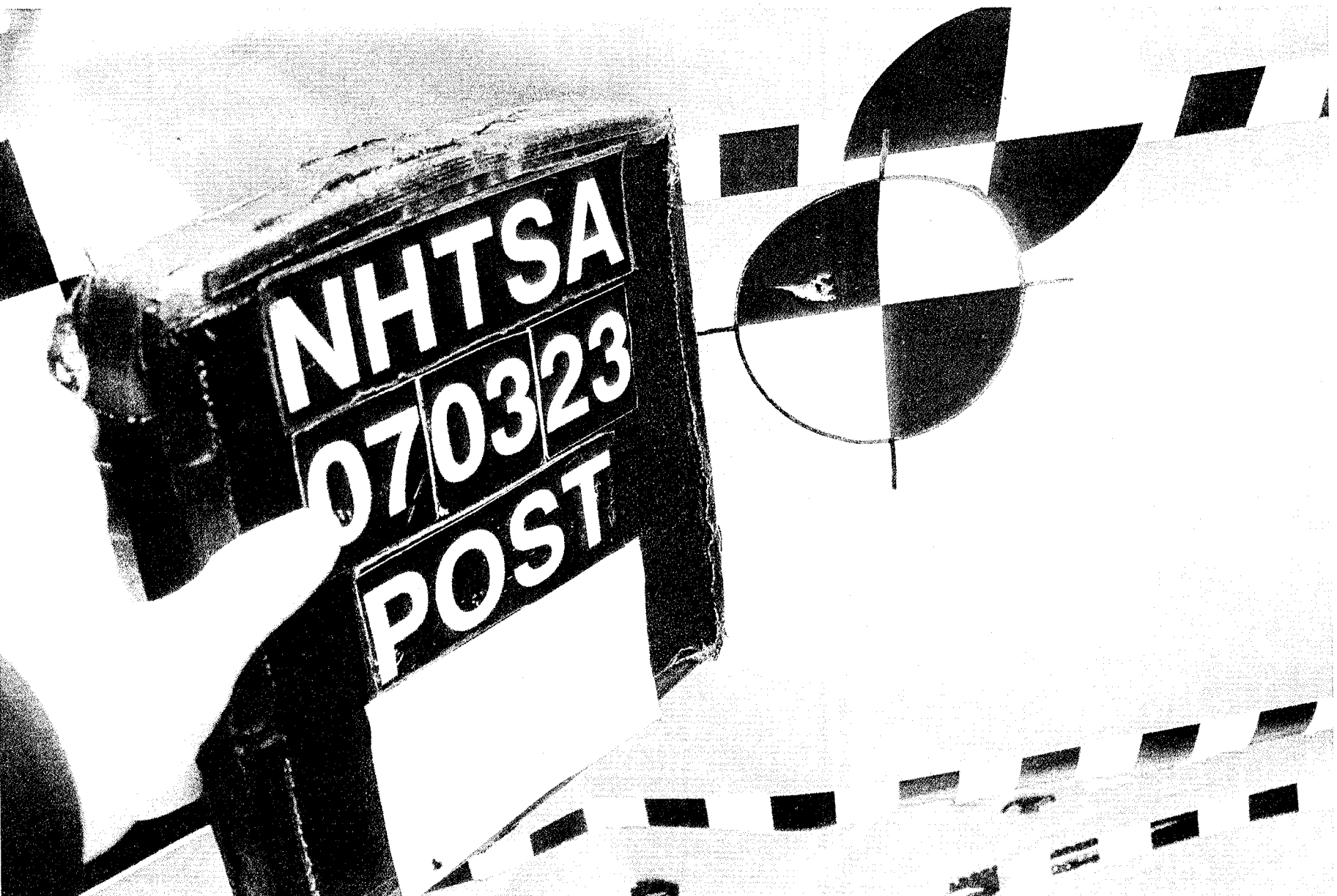


Figure A-71 Post-Test Secondary Impact Point View

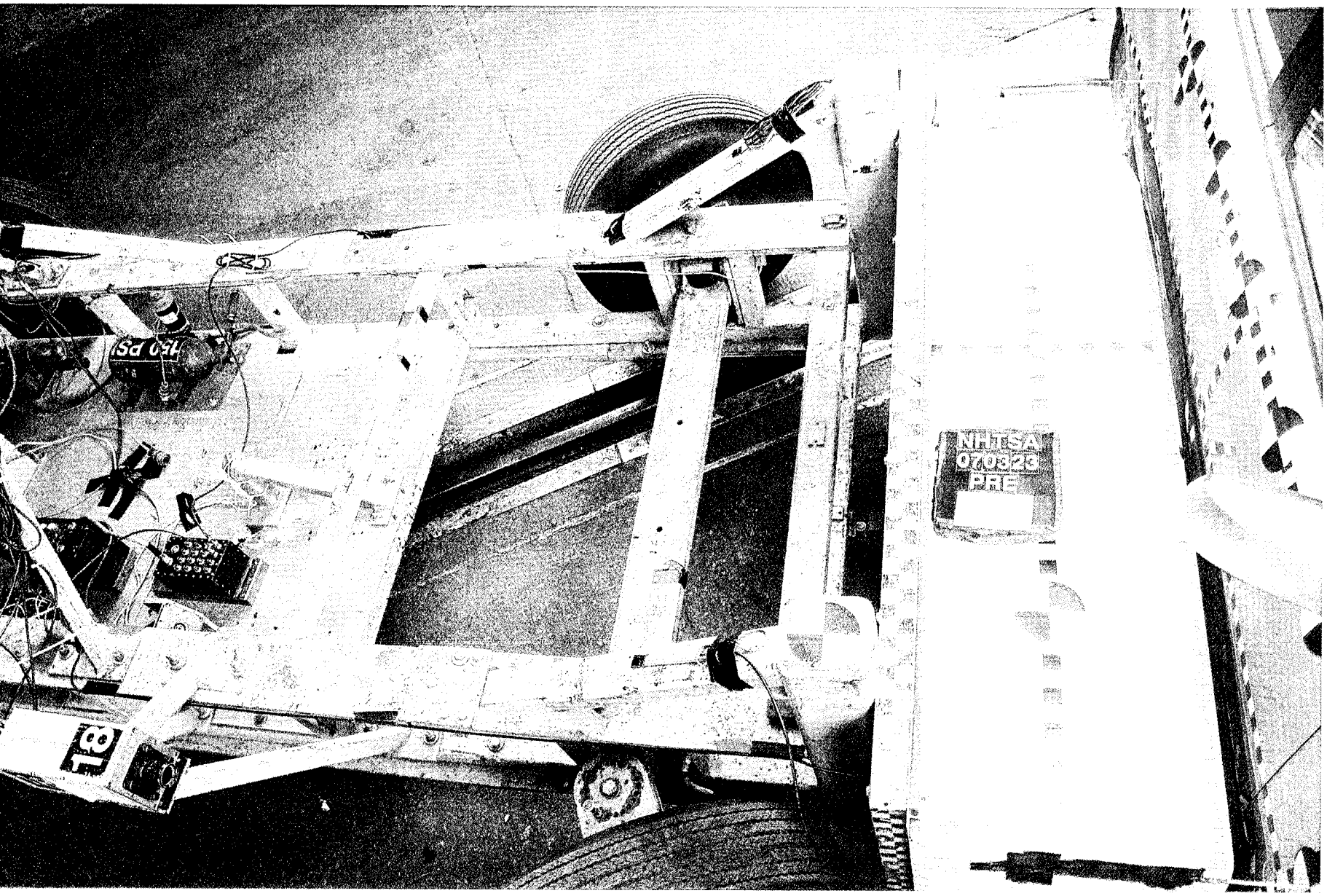
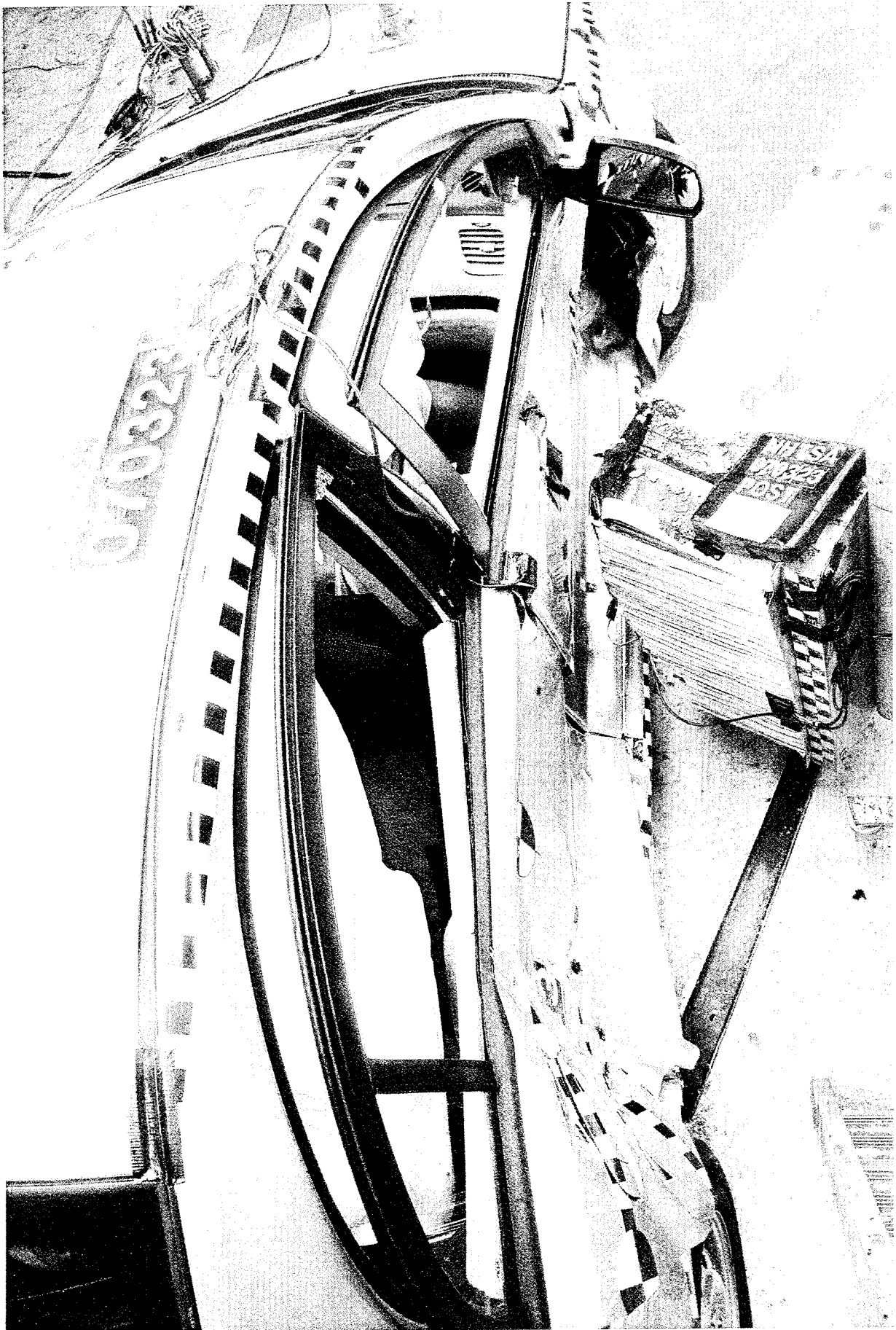
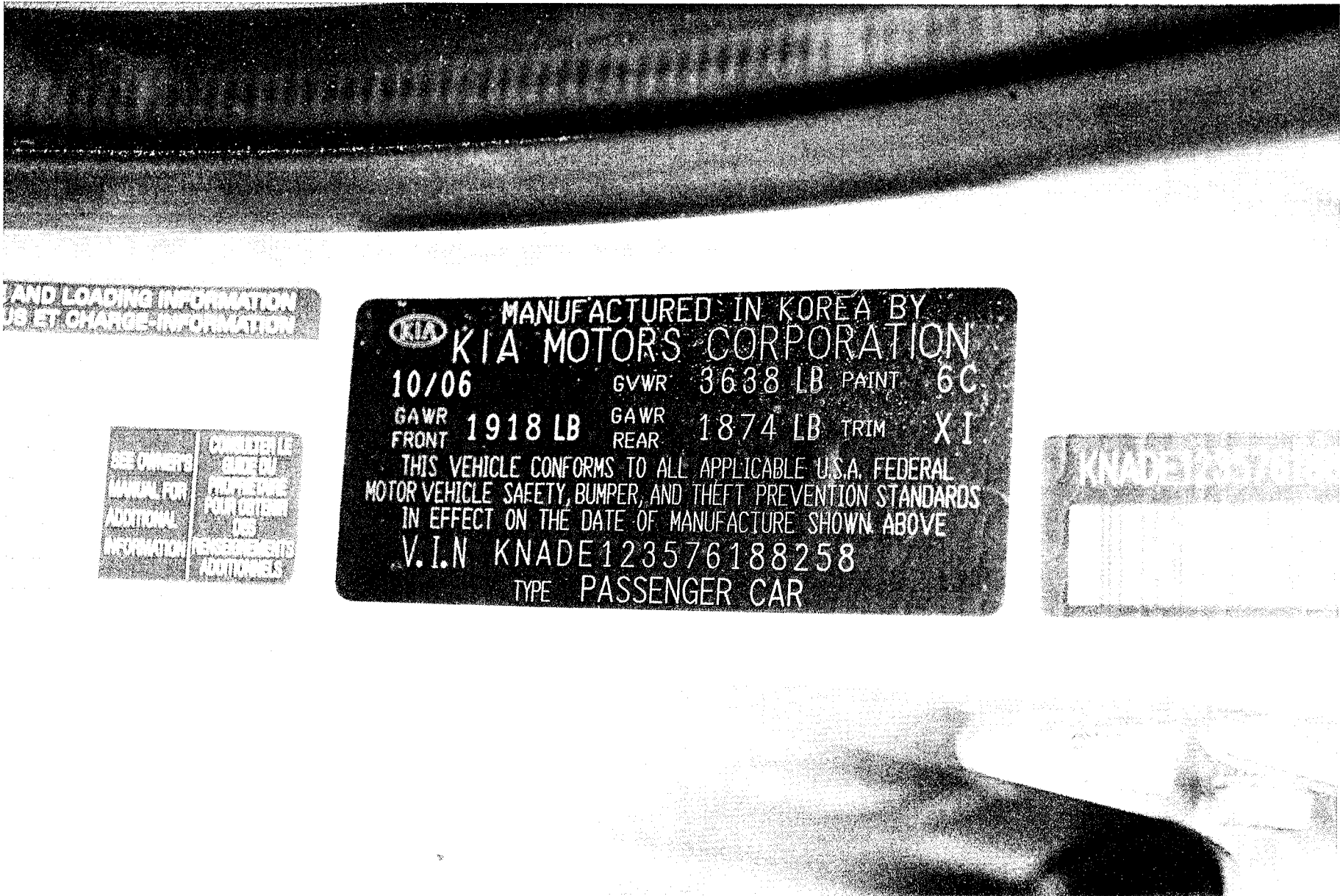


Figure A-72 Pre-Test Overhead view of MDB With Impactor Face in Position



**Figure A-73 Post-Test Overhead view of MDB With Impactor Face in Position**





AND LOADING INFORMATION  
US ET CHANGE-INFORMATION

|                                                        |                                                                                     |
|--------------------------------------------------------|-------------------------------------------------------------------------------------|
| SEE OWNER'S<br>MANUAL FOR<br>ADDITIONAL<br>INFORMATION | CONVERTIBLE<br>GRADE IN<br>PREPARED<br>FOR OUTDOOR<br>USE<br>REMARKS<br>ADDITIONALS |
|--------------------------------------------------------|-------------------------------------------------------------------------------------|

MANUFACTURED IN KOREA BY  
**KIA MOTORS CORPORATION**  
10/06 GVWR 3638 LB PAINT 6C  
GAWR 1918 LB GAWR 1874 LB TRIM XI  
FRONT REAR  
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S.A. FEDERAL  
MOTOR VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS  
IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE  
V.I.N KNADE123576188258  
TYPE PASSENGER CAR

KNADE123576188258  
[Barcode]

Figure A-74 Pre-Test Vehicle Certification Label View

MANUFACTURED

KIA MOTORS

10/06

GAWR FRONT 1918 LB GAWR REAR

THIS VEHICLE CONFORMS TO ALL MOTOR VEHICLE SAFETY, BUMPER, AND IN EFFECT ON THE DATE OF MANUFACTURE.

V.I.N. KNADE12357

TYP. PASSENGER

TIRE AND LOADING INFORMATION

PNEUS ET CHARGE-INFORMATION

|                  |         |         |           |
|------------------|---------|---------|-----------|
| SEATING CAPACITY | TOTAL 5 | FRONT 2 | REAR 3    |
| NOMBRE DE SIÈGES | TOTAL 5 | AVANT 2 | ARRIÈRE 3 |

The combined weight of occupants and cargo should never exceed 385kg or 849lbs.  
Le poids combiné des occupants et du chargement ne doit jamais excéder 385kg ou 849lb.

| TIRE / PNEU     | SIZE / DIMENSION | COLD TIRE PRESSURE / PRESSION À FROID |
|-----------------|------------------|---------------------------------------|
| FRONT / AVANT   | P175/70R14       | 210kPa, 30psi                         |
| REAR / ARRIÈRE  | P175/70R14       | 210kPa, 30psi                         |
| SPARE / SECOURS | T115/70D15       | 420kPa, 60psi                         |

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

CONSULTER LE GUIDE DU PROPRIÉTAIRE POUR OBTENIR DES RENSEIGNEMENTS ADDITIONNELS

Figure A-75 Pre-Test Vehicle Recommended Tire Pressure Label View



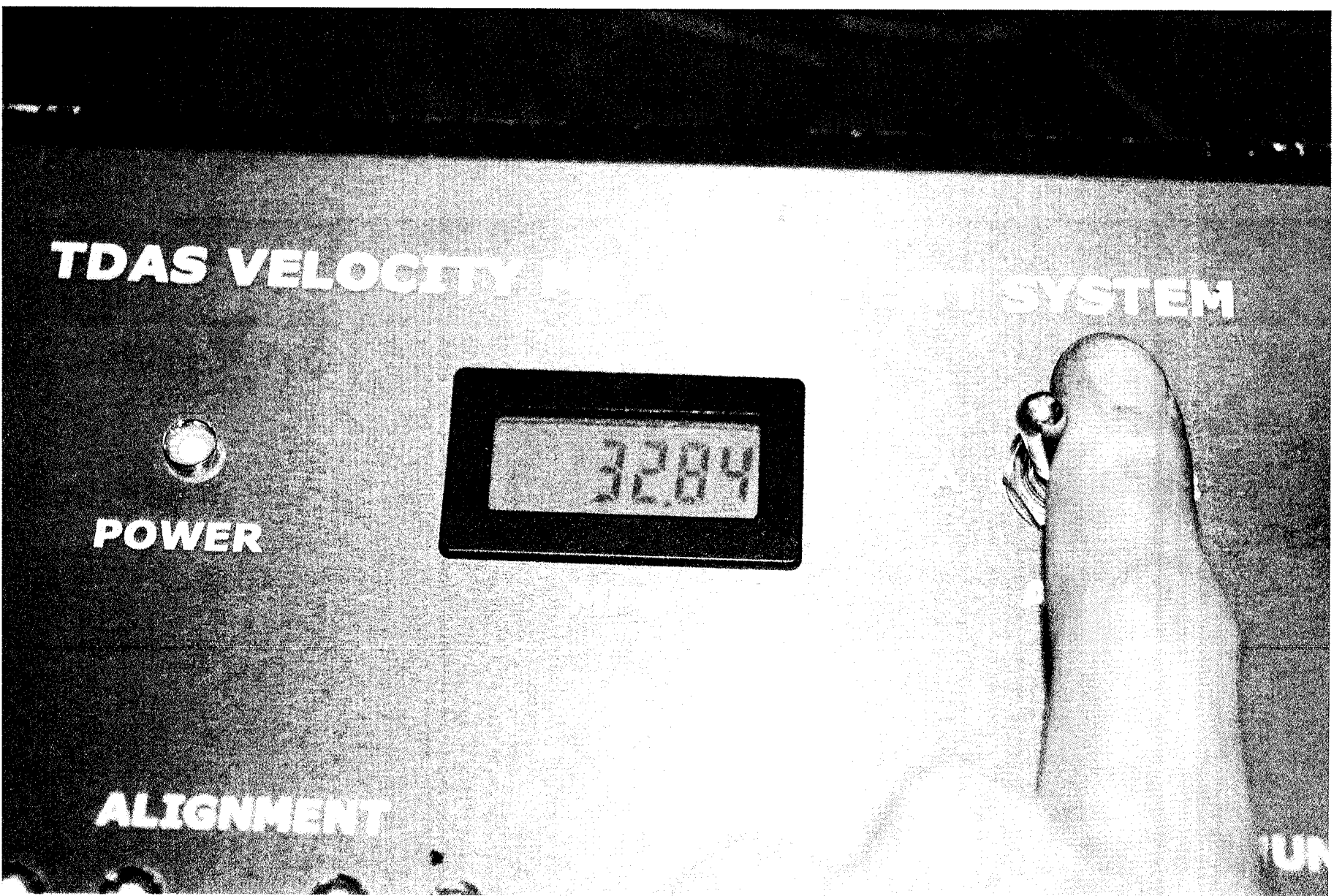


Figure A-76 Post-Test Light Trap Digital Readout - View 1

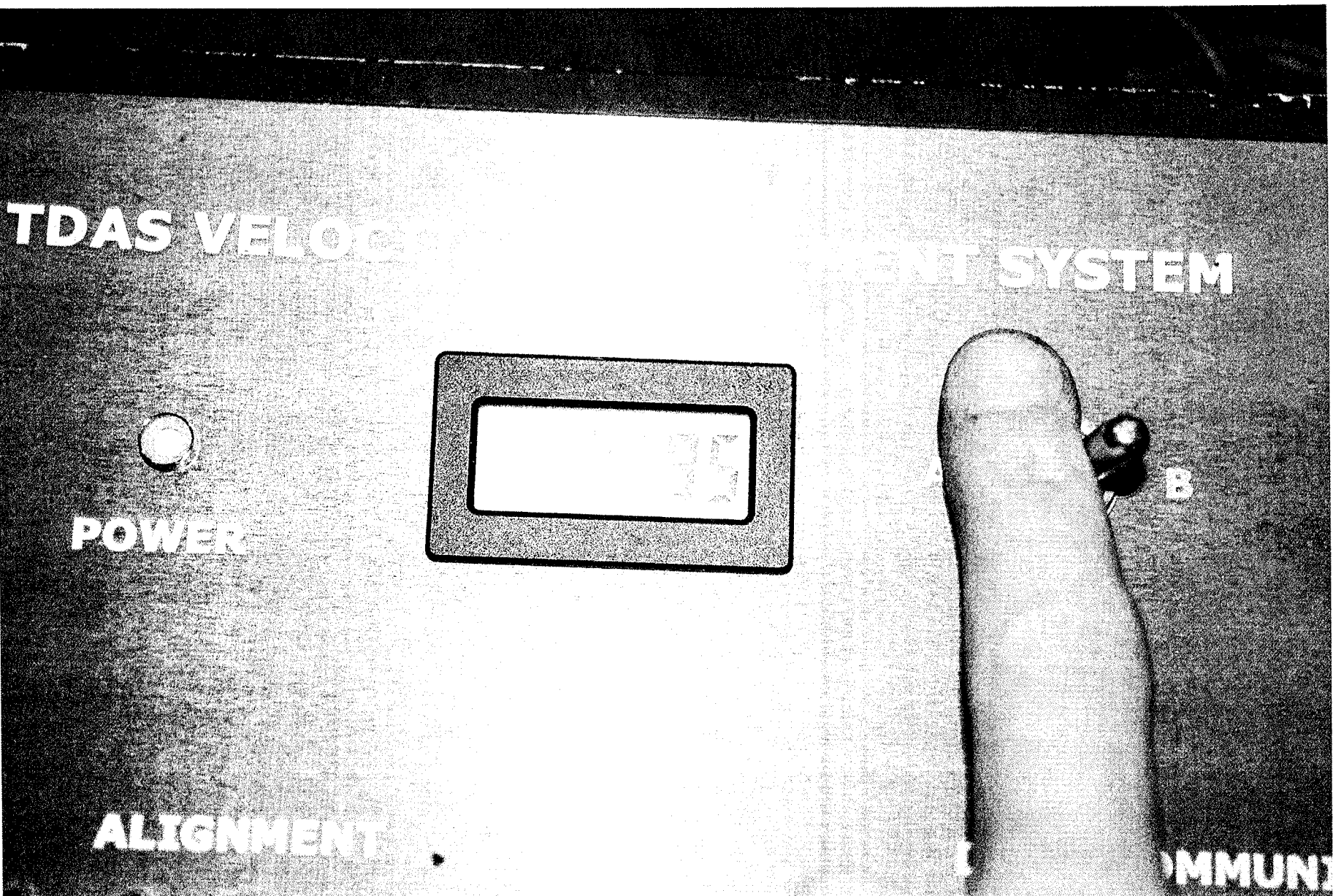


Figure A-77 Post-Test Light Trap Digital Readout - View 2

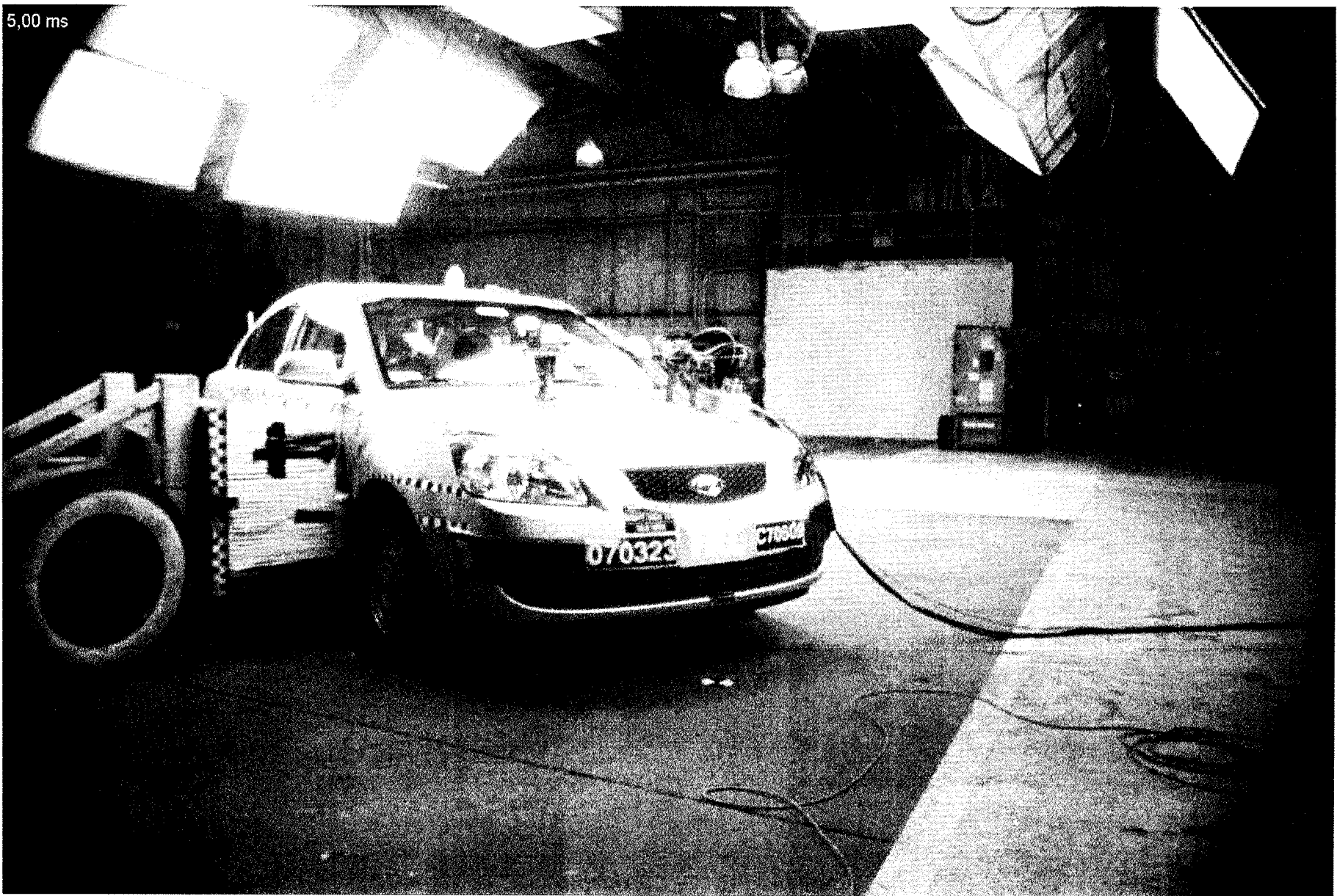


Figure A-78 Impact Event

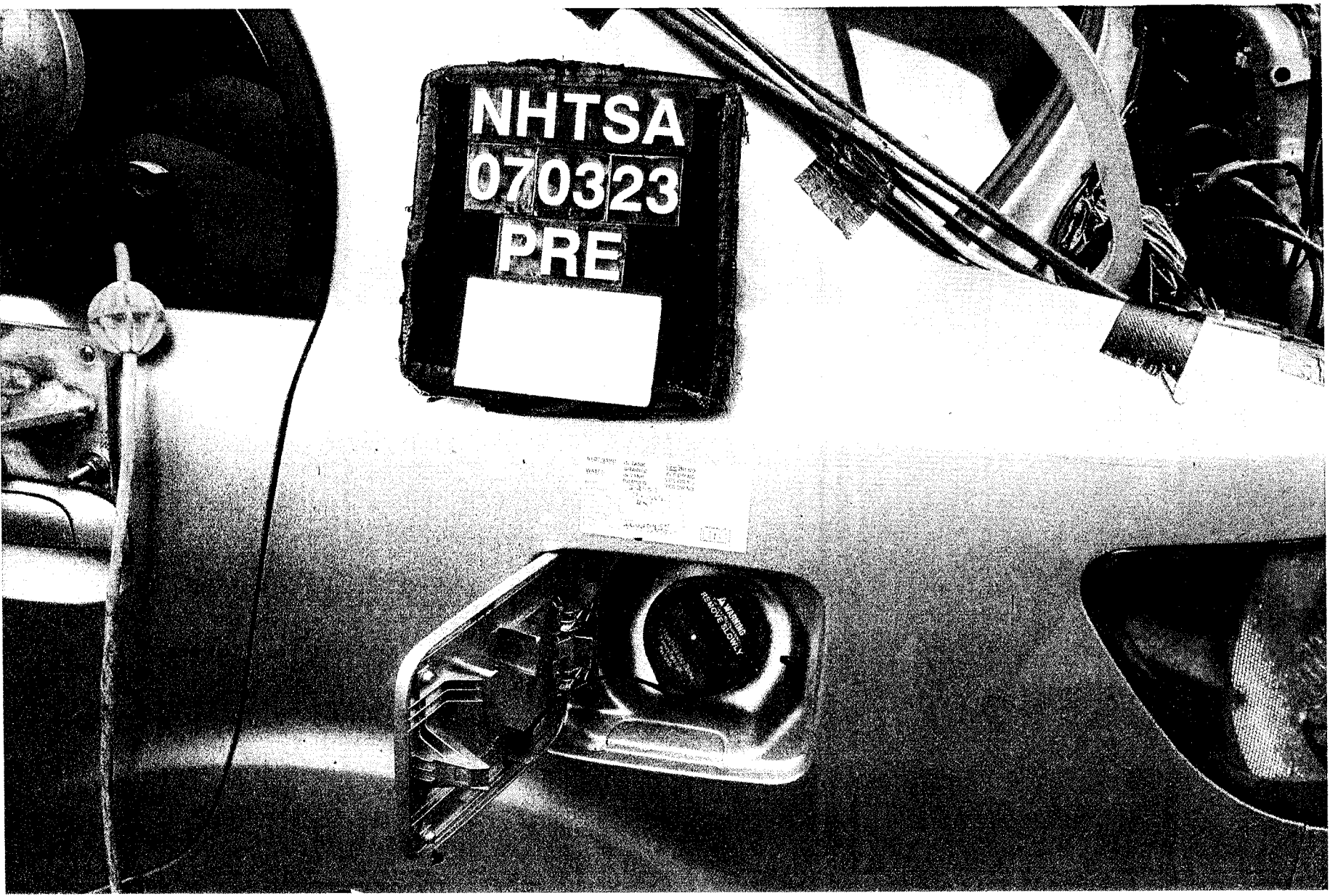


Figure A-79 Pre-Test Fuel Cap





Figure A-80 Post-Test Fuel Cap

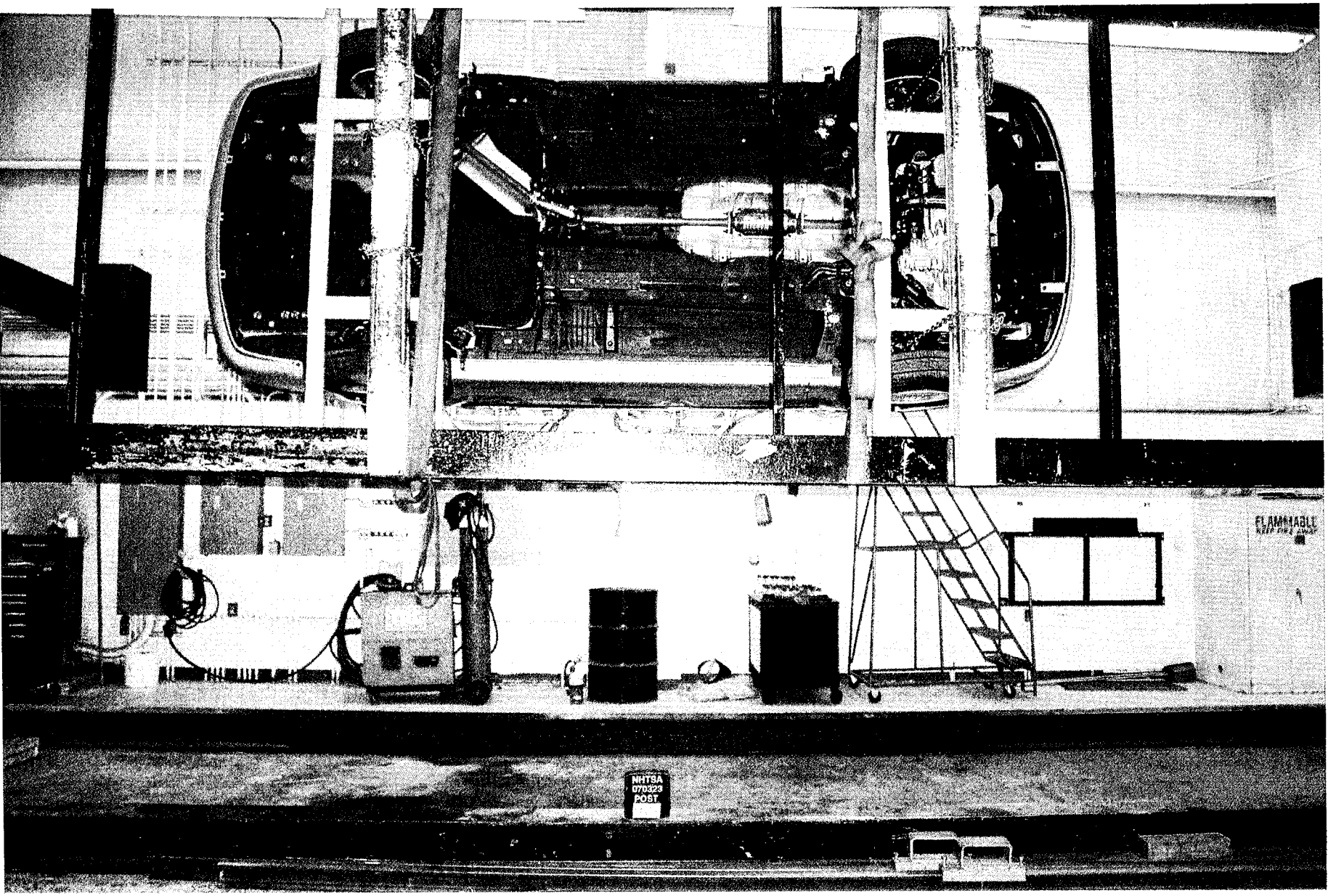


Figure A-81 FMVSS 301 Rollover View at 90°

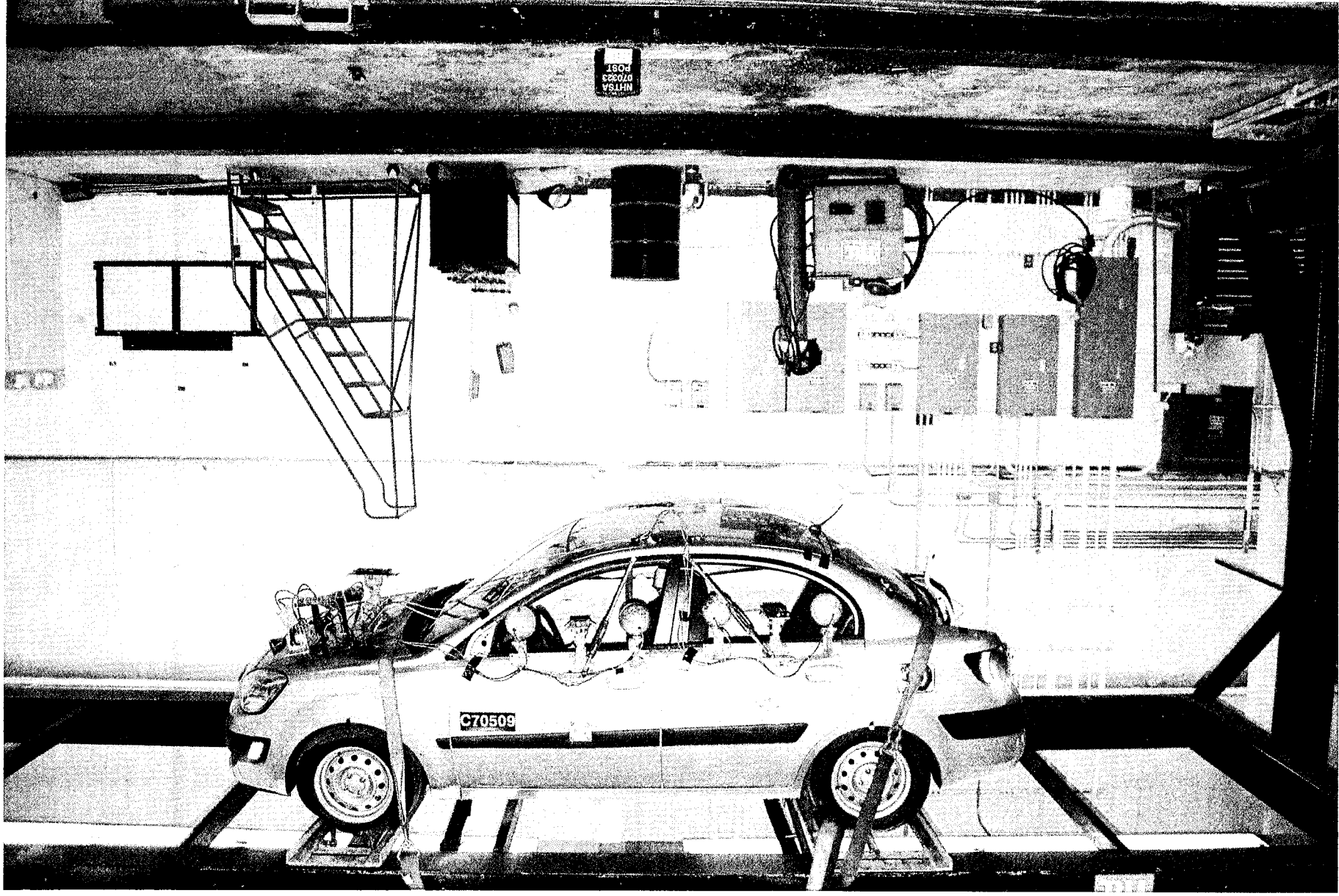


Figure A-82 FMVSS 301 Rollover View at 180°



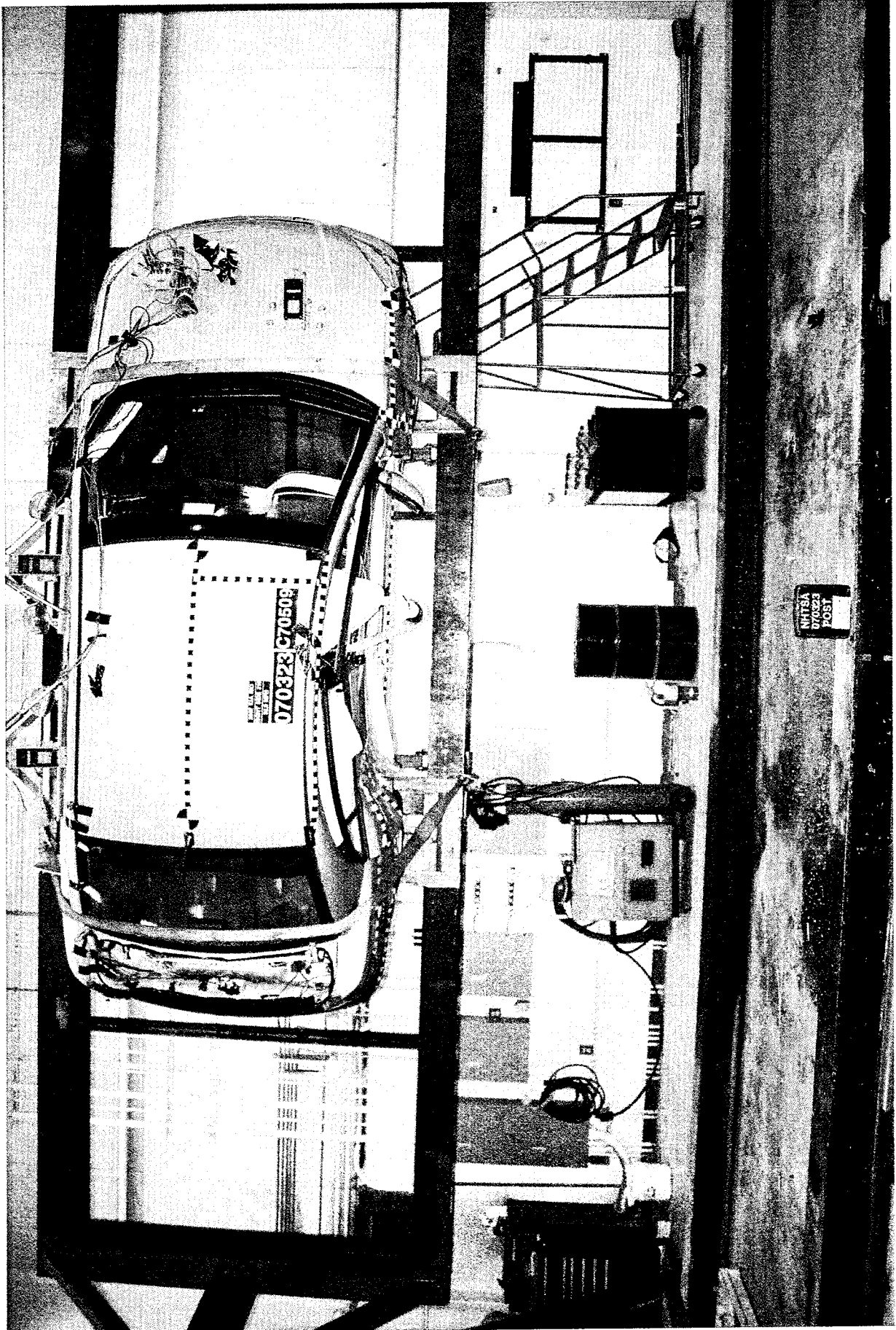


Figure A-83 FMVSS 301 Rollover View at 270°

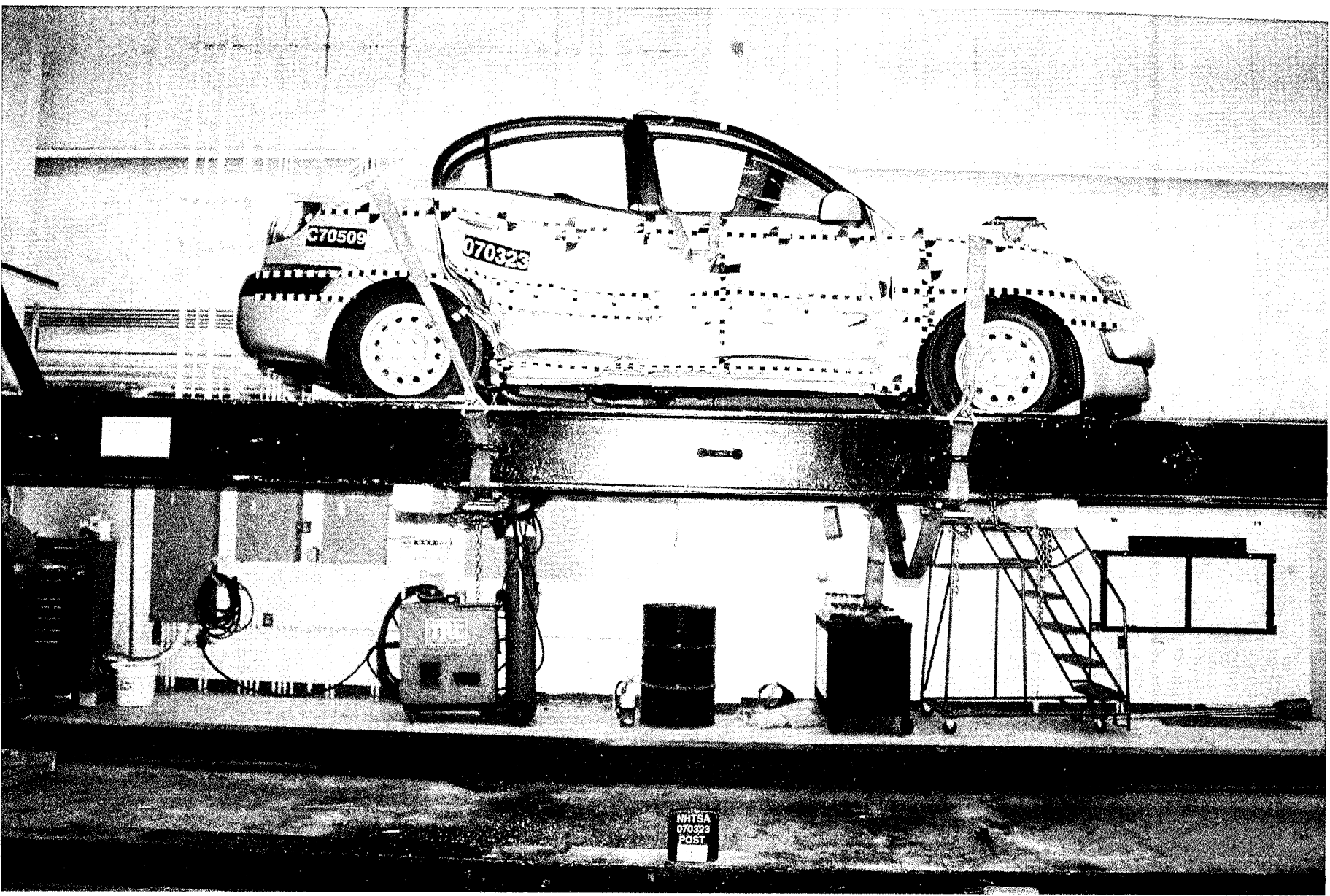


Figure A-84 FMVSS 301 Rollover View at 360°

## Appendix B

### Data Plots

### Table of Data Plots

#### Right Front and Right Rear Passenger Dummy Instrumentation Plots

Acceleration Data - Filter Class 1000

Integration Data - Filter Class 180

Force Data - Filter Class 1000

Moment Data - Filter Class 600

Contact Data - Filter Class 1000

| <u>Plot No.</u> | <u>Data Plot Title</u>                                | <u>Page</u> |
|-----------------|-------------------------------------------------------|-------------|
| 1               | Right Front Passenger Upper Rib Y-Axis Acceleration   | B-9         |
| 2               | Right Front Passenger Upper Rib Y-Axis Velocity       | B-10        |
| 3               | Right Front Passenger Lower Rib Y-Axis Acceleration   | B-11        |
| 4               | Right Front Passenger Lower Rib Y-Axis Velocity       | B-12        |
| 5               | Right Front Passenger Lower Spine Y-Axis Acceleration | B-13        |
| 6               | Right Front Passenger Lower Spine Y-Axis Velocity     | B-14        |
| 7               | Right Front Passenger Pelvis Y-Axis Acceleration      | B-15        |
| 8               | Right Front Passenger Pelvis Y-Axis Velocity          | B-16        |
| 9               | Right Rear Passenger Upper Rib Y-Axis Acceleration    | B-17        |
| 10              | Right Rear Passenger Upper Rib Y-Axis Velocity        | B-18        |
| 11              | Right Rear Passenger Lower Rib Y-Axis Acceleration    | B-19        |
| 12              | Right Rear Passenger Lower Rib Y-Axis Velocity        | B-20        |
| 13              | Right Rear Passenger Lower Spine Y-Axis Acceleration  | B-21        |
| 14              | Right Rear Passenger Lower Spine Y-Axis Velocity      | B-22        |
| 15              | Right Rear Passenger Pelvis Y-Axis Acceleration       | B-23        |
| 16              | Right Rear Passenger Pelvis Y-Axis Velocity           | B-24        |

Table of Data Plots (Continued)

Right Front and Right Rear Passenger Dummy Redundant Instrumentation Plots

Acceleration Data - Filter Class 1000 - Redundant

Integration Data - Filter Class 180 - Redundant

| <u>Plot No.</u> | <u>Data Plot Title</u>                                          | <u>Page</u> |
|-----------------|-----------------------------------------------------------------|-------------|
| 17              | Right Front Passenger Upper Rib Y-Axis Redundant Acceleration   | B-26        |
| 18              | Right Front Passenger Upper Rib Y-Axis Redundant Velocity       | B-27        |
| 19              | Right Front Passenger Lower Rib Y-Axis Redundant Acceleration   | B-28        |
| 20              | Right Front Passenger Lower Rib Y-Axis Redundant Velocity       | B-29        |
| 21              | Right Front Passenger Lower Spine Y-Axis Redundant Acceleration | B-30        |
| 22              | Right Front Passenger Lower Spine Y-Axis Redundant Velocity     | B-31        |
| 23              | Right Rear Passenger Upper Rib Y-Axis Redundant Acceleration    | B-32        |
| 24              | Right Rear Passenger Upper Rib Y-Axis Redundant Velocity        | B-33        |
| 25              | Right Rear Passenger Lower Rib Y-Axis Redundant Acceleration    | B-34        |
| 26              | Right Rear Passenger Lower Rib Y-Axis Redundant Velocity        | B-35        |
| 27              | Right Rear Passenger Lower Spine Y-Axis Redundant Acceleration  | B-36        |
| 28              | Right Rear Passenger Lower Spine Y-Axis Redundant Velocity      | B-37        |

Table of Data Plots (Continued)  
Test Vehicle Instrumentation Plots  
Acceleration Data - Filter Class 60  
Integration Data - Filter Class 180

| <u>Plot No.</u> | <u>Data Plot Title</u>                              | <u>Page</u> |
|-----------------|-----------------------------------------------------|-------------|
| 29              | Left Side Sill at Front Seat X-Axis Acceleration    | B-39        |
| 30              | Left Side Sill at Front Seat X-Axis Velocity        | B-40        |
| 31              | Left Side Sill at Front Seat Y-Axis Acceleration    | B-41        |
| 32              | Left Side Sill at Front Seat Y-Axis Velocity        | B-42        |
| 33              | Left Side Sill at Front Seat Z-Axis Acceleration    | B-43        |
| 34              | Left Side Sill at Front Seat Z-Axis Velocity        | B-44        |
| 35              | Left Side Sill at Front Seat Resultant Acceleration | B-45        |
| 36              | Left Side Sill at Rear Seat X-Axis Acceleration     | B-46        |
| 37              | Left Side Sill at Rear Seat X-Axis Velocity         | B-47        |
| 38              | Left Side Sill at Rear Seat Y-Axis Acceleration     | B-48        |
| 39              | Left Side Sill at Rear Seat Y-Axis Velocity         | B-49        |
| 40              | Left Side Sill at Rear Seat Z-Axis Acceleration     | B-50        |
| 41              | Left Side Sill at Rear Seat Z-Axis Velocity         | B-51        |
| 42              | Left Side Sill at Rear Seat Resultant Acceleration  | B-52        |
| 43              | Rear Floorpan Above Axle X-Axis Acceleration        | B-53        |
| 44              | Rear Floorpan Above Axle X-Axis Velocity            | B-54        |
| 45              | Rear Floorpan Above Axle Y-Axis Acceleration        | B-55        |
| 46              | Rear Floorpan Above Axle Y-Axis Velocity            | B-56        |
| 47              | Rear Floorpan Above Axle Z-Axis Acceleration        | B-57        |
| 48              | Rear Floorpan Above Axle Z-Axis Velocity            | B-58        |
| 49              | Rear Floorpan Above Axle Resultant Acceleration     | B-59        |
| 50              | Right Side Sill at Front Seat Y-Axis Acceleration   | B-60        |
| 51              | Right Side Sill at Front Seat Y-Axis Velocity       | B-61        |
| 52              | Right Side Sill at Front Seat Y-Axis Displacement   | B-62        |

Table of Data Plots (Continued)  
Test Vehicle Instrumentation Plots (Continued)  
Acceleration Data - Filter Class 60  
Integration Data - Filter Class 180

| <u>Plot No.</u> | <u>Data Plot Title</u>                             | <u>Page</u> |
|-----------------|----------------------------------------------------|-------------|
| 53              | Right Side Sill at Rear Seat Y-Axis Acceleration   | B-63        |
| 54              | Right Side Sill at Rear Seat Y-Axis Velocity       | B-64        |
| 55              | Right Side Sill at Rear Seat Y-Axis Displacement   | B-65        |
| 56              | Left Rear Occupant Compartment Y-Axis Acceleration | B-66        |
| 57              | Left Rear Occupant Compartment Y-Axis Velocity     | B-67        |
| 58              | Left Rear Occupant Compartment Y-Axis Displacement | B-68        |
| 59              | Right Lower A-Post Y-Axis Acceleration             | B-69        |
| 60              | Right Lower A-Post Y-Axis Velocity                 | B-70        |
| 61              | Right Middle A-Post Y-Axis Acceleration            | B-71        |
| 62              | Right Middle A-Post Y-Axis Velocity                | B-72        |
| 63              | Right Lower B-Post Y-Axis Acceleration             | B-73        |
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Right Front and Right Rear Passenger Dummy Instrumentation Plots



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER UPPER RIB Y-AXIS ACCELERATION

Time: 12:32

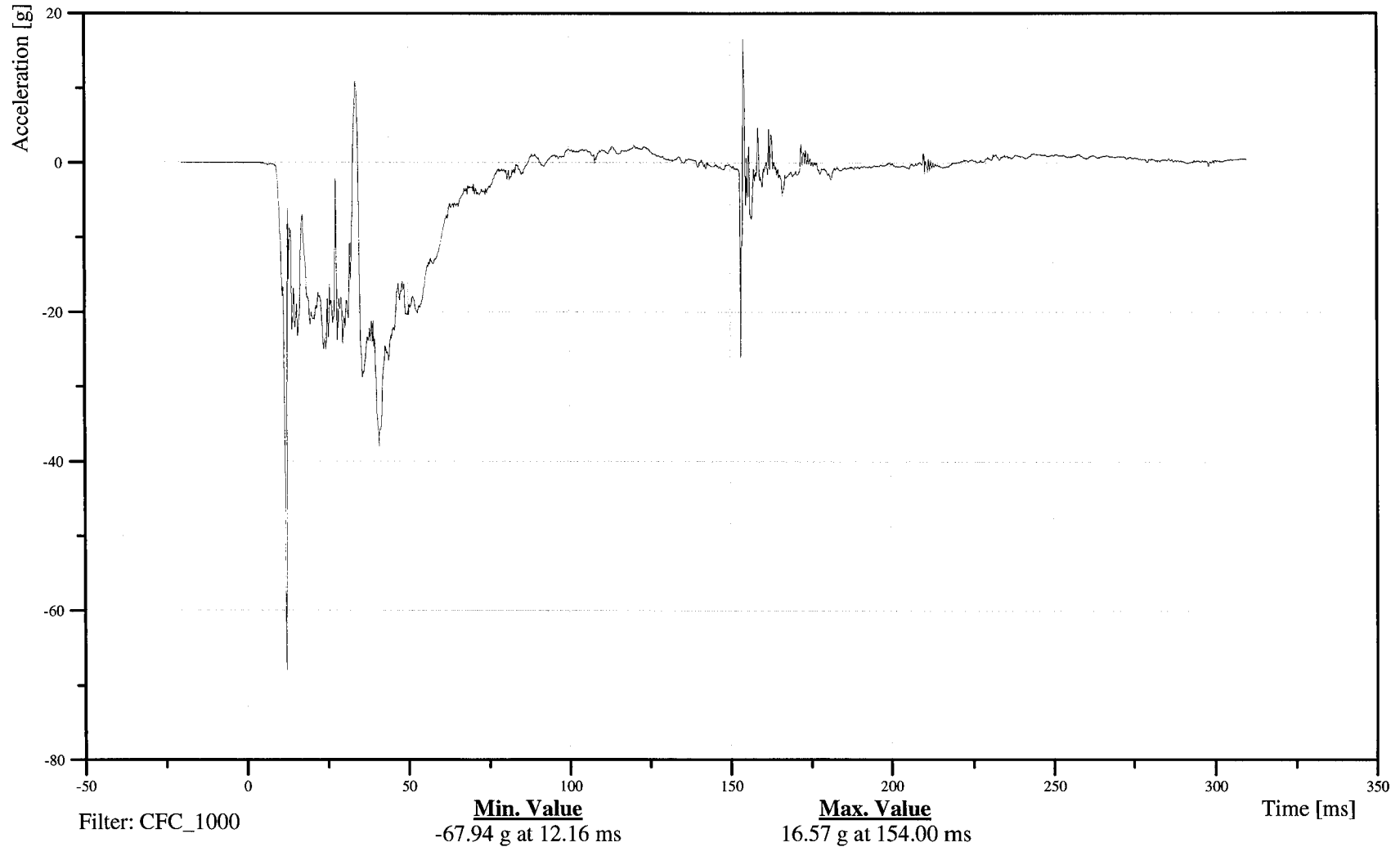
Customer: NHTSA

Test Number: C70509

13RIBSRU00SIACYA

TRC Inc. Test Lab: CTF

Test Number: 070323



B-9

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER UPPER RIB Y-AXIS VELOCITY

Time: 12:32

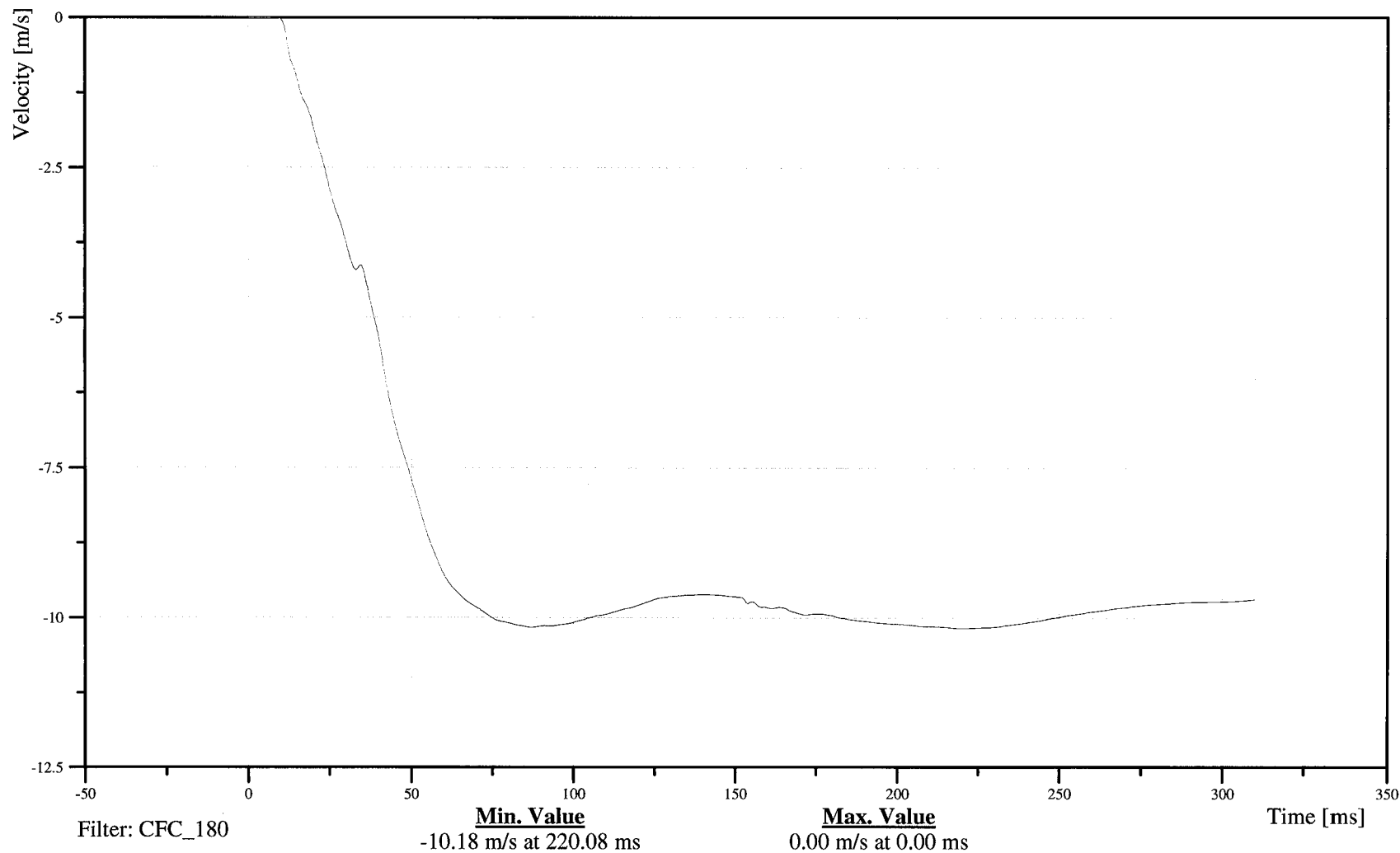
Customer: NHTSA

Test Number: C70509

13RIBSRU00SIVEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-10

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER LOWER RIB Y-AXIS ACCELERATION

Time: 12:32

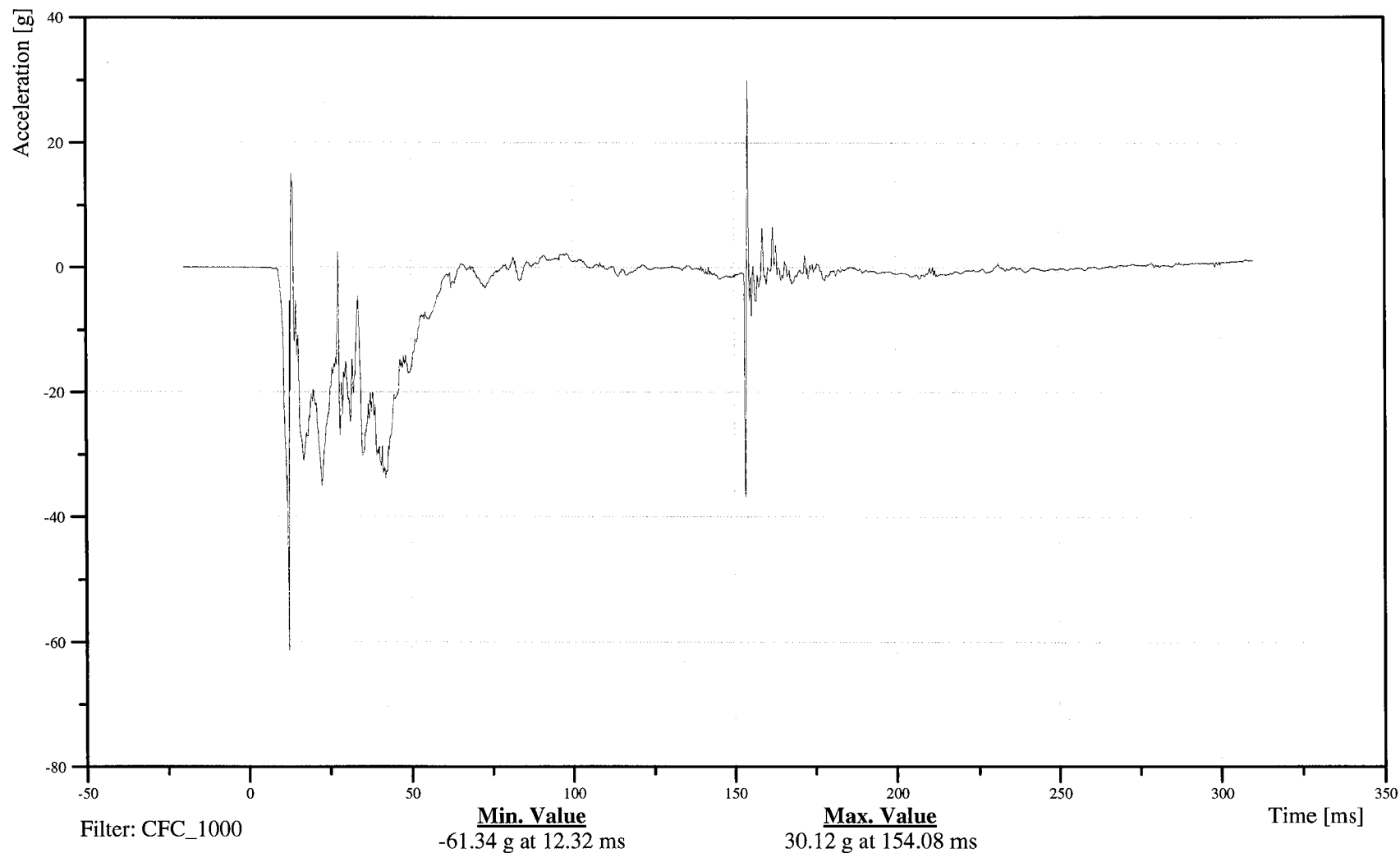
Customer: NHTSA

Test Number: C70509

13RIBSRL00SIACYA

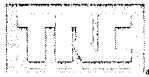
TRC Inc. Test Lab: CTF

Test Number: 070323



B-11

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER LOWER RIB Y-AXIS VELOCITY

Time: 12:32

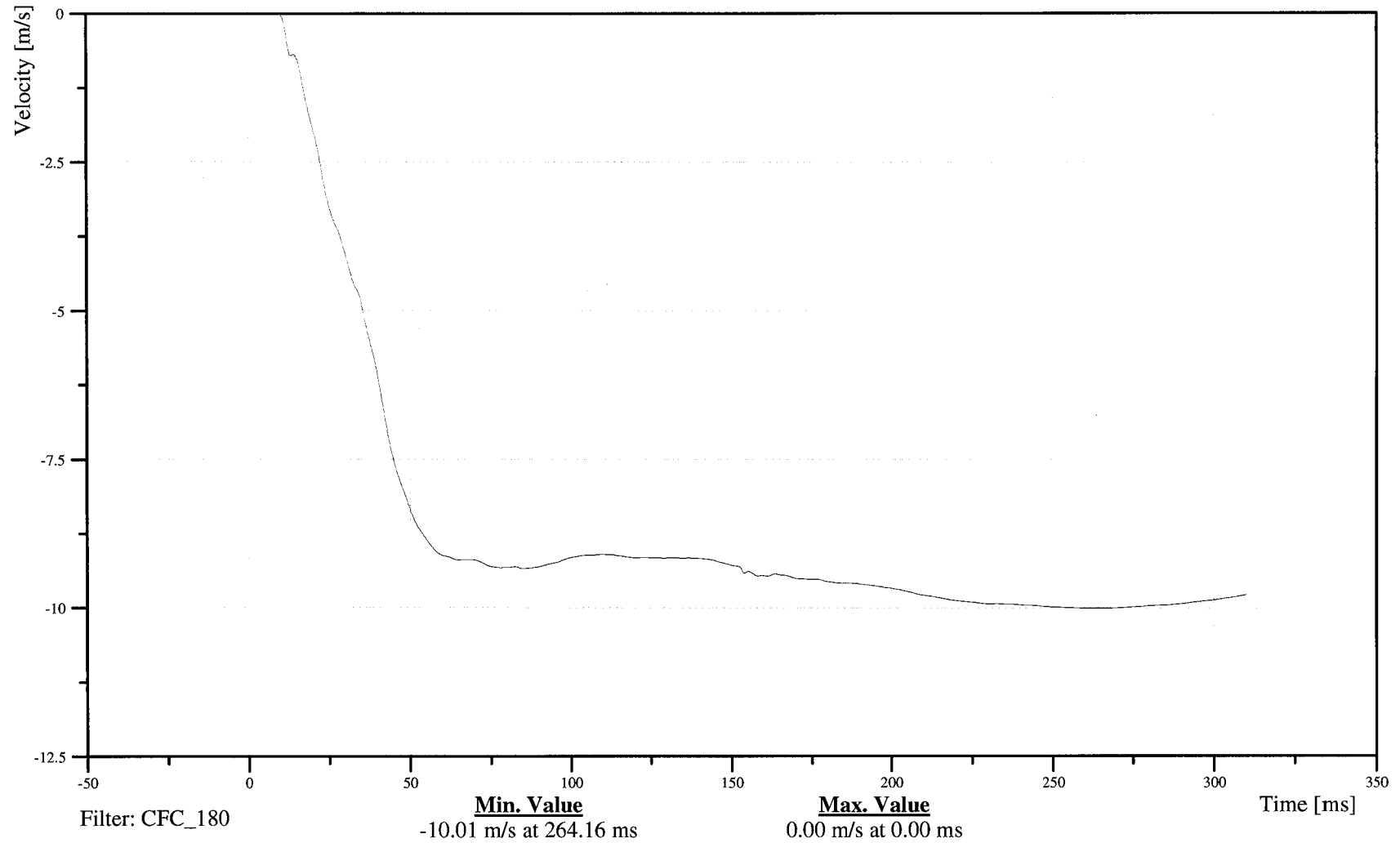
Customer: NHTSA

Test Number: C70509

13RIBSRL00SIVEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-12

070323





48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER LOWER SPINE Y-AXIS ACCELERATION

Time: 12:32

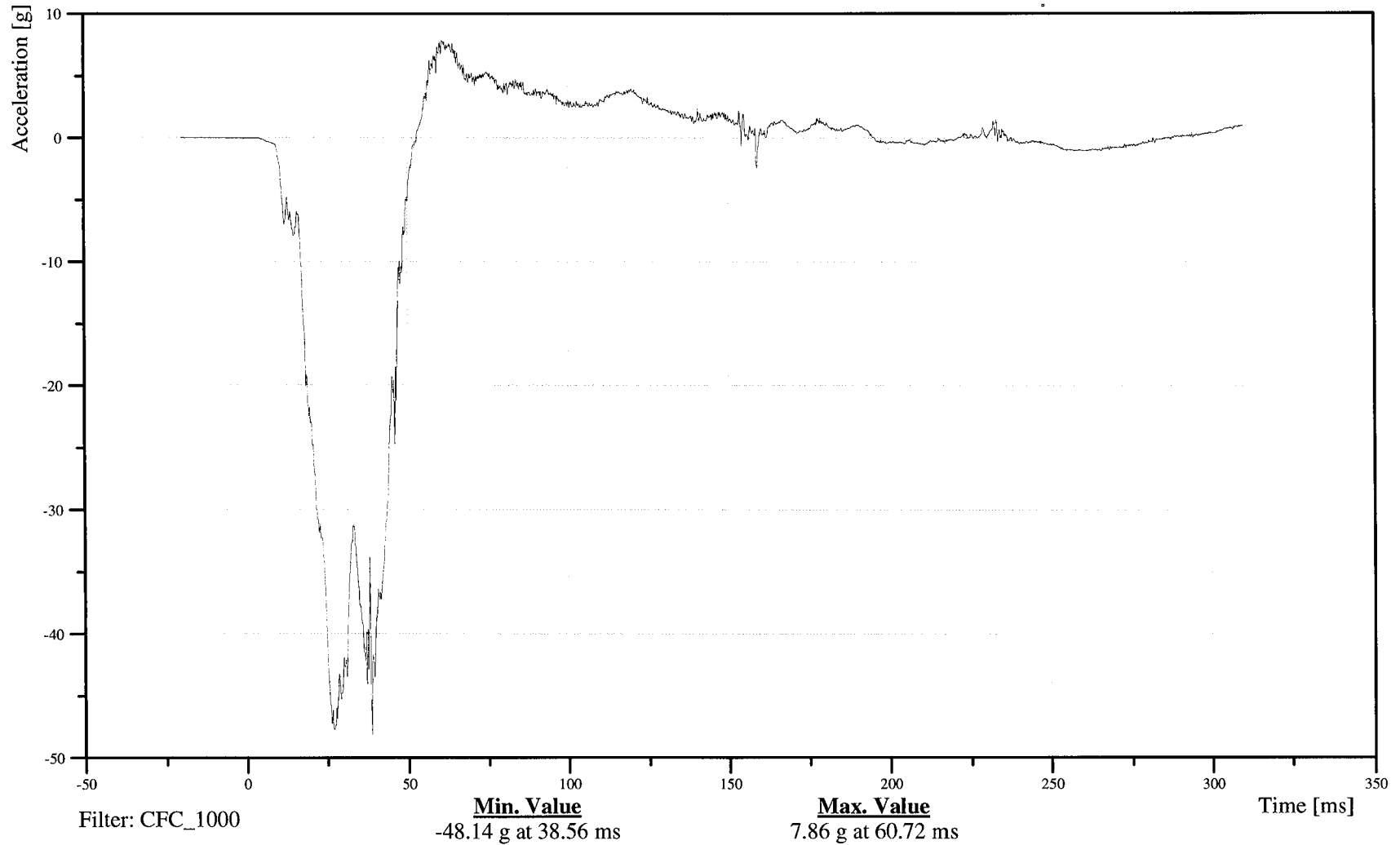
Customer: NHTSA

Test Number: C70509

13SPIN1200SIACYA

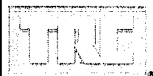
TRC Inc. Test Lab: CTF

Test Number: 070323



B-13

070323



# 48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

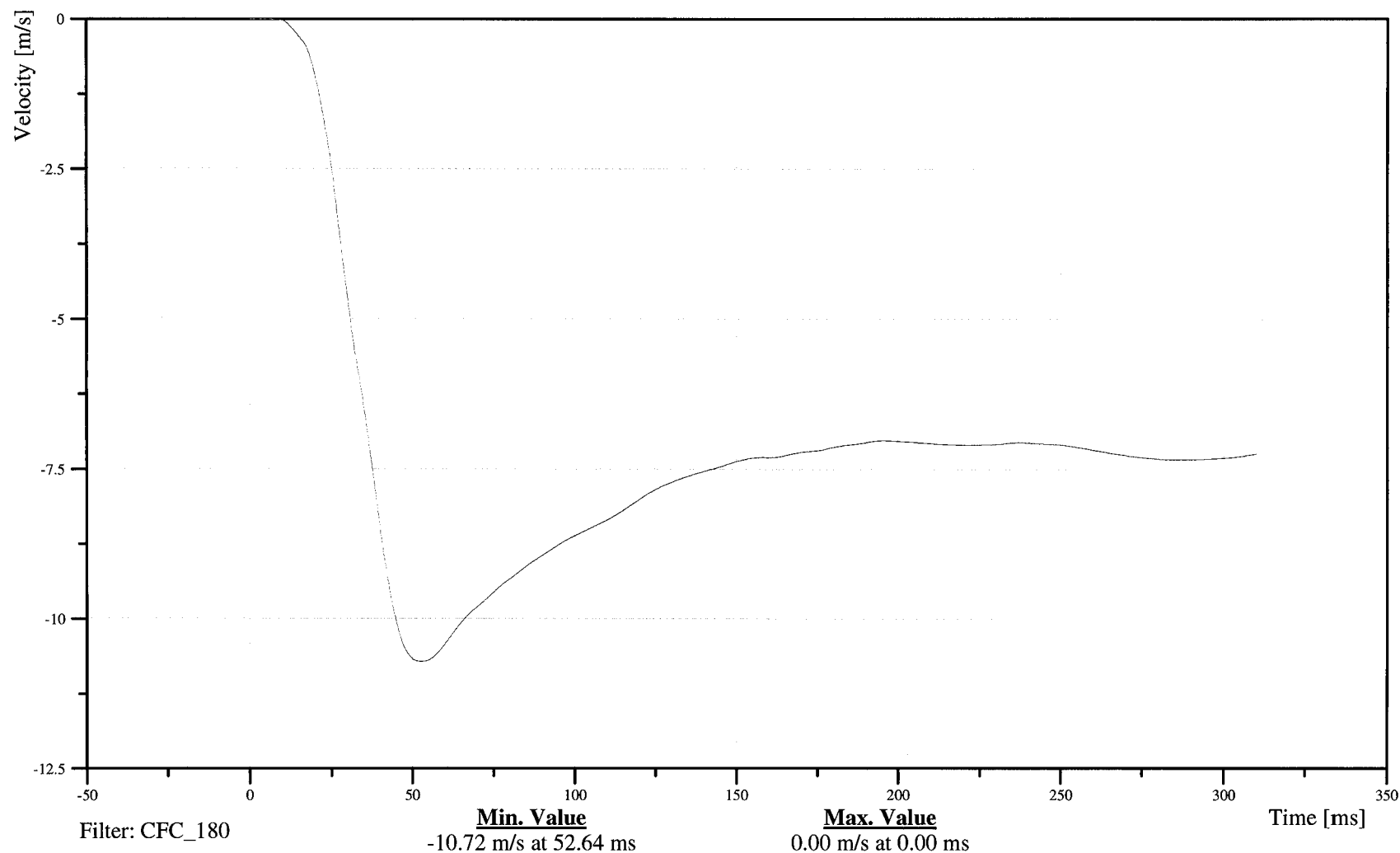
Date: 03/23/2007  
Time: 12:32

## RIGHT FRONT PASSENGER LOWER SPINE Y-AXIS VELOCITY

Customer: NHTSA  
Test Number: C70509

### 13SPIN1200SIVEYC

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-14

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER PELVIS Y-AXIS ACCELERATION

Time: 12:32

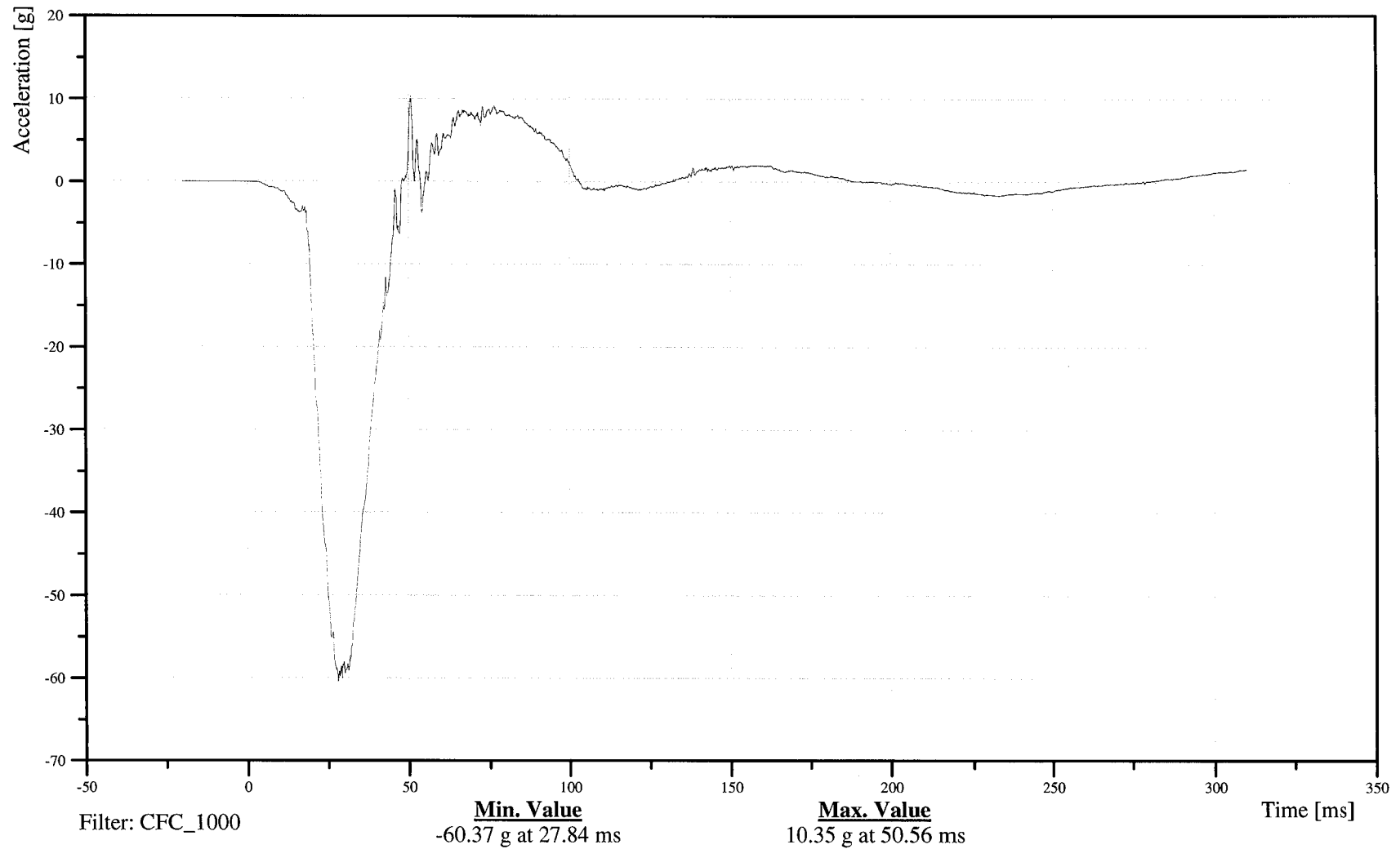
Customer: NHTSA

Test Number: C70509

13PELVCG00SIACYA

TRC Inc. Test Lab: CTF

Test Number: 070323



B-15

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER PELVIS Y-AXIS VELOCITY

Time: 12:32

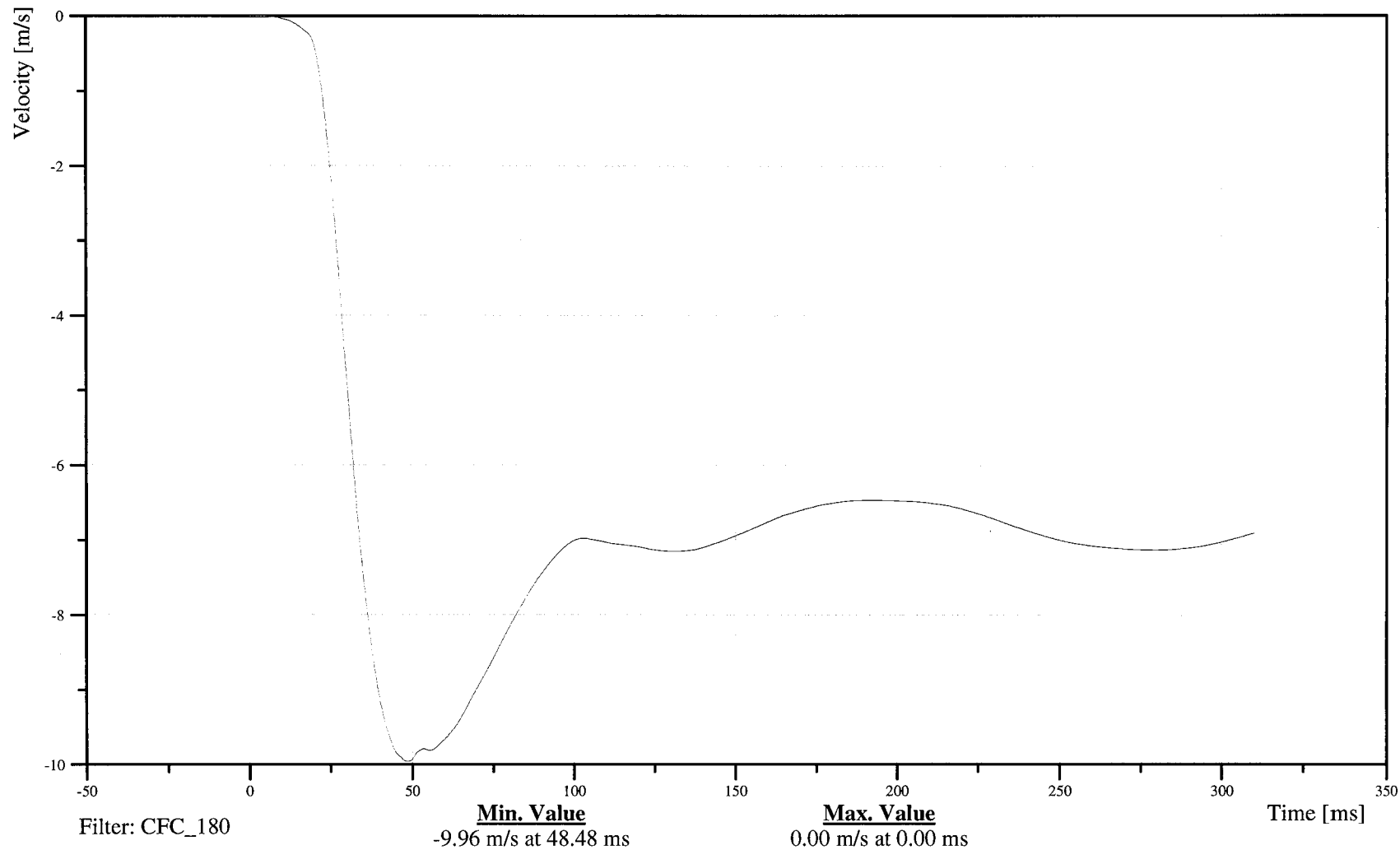
Customer: NHTSA

Test Number: C70509

13PELVCG00SIVEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-16

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT REAR PASSENGER UPPER RIB Y-AXIS ACCELERATION

Time: 12:32

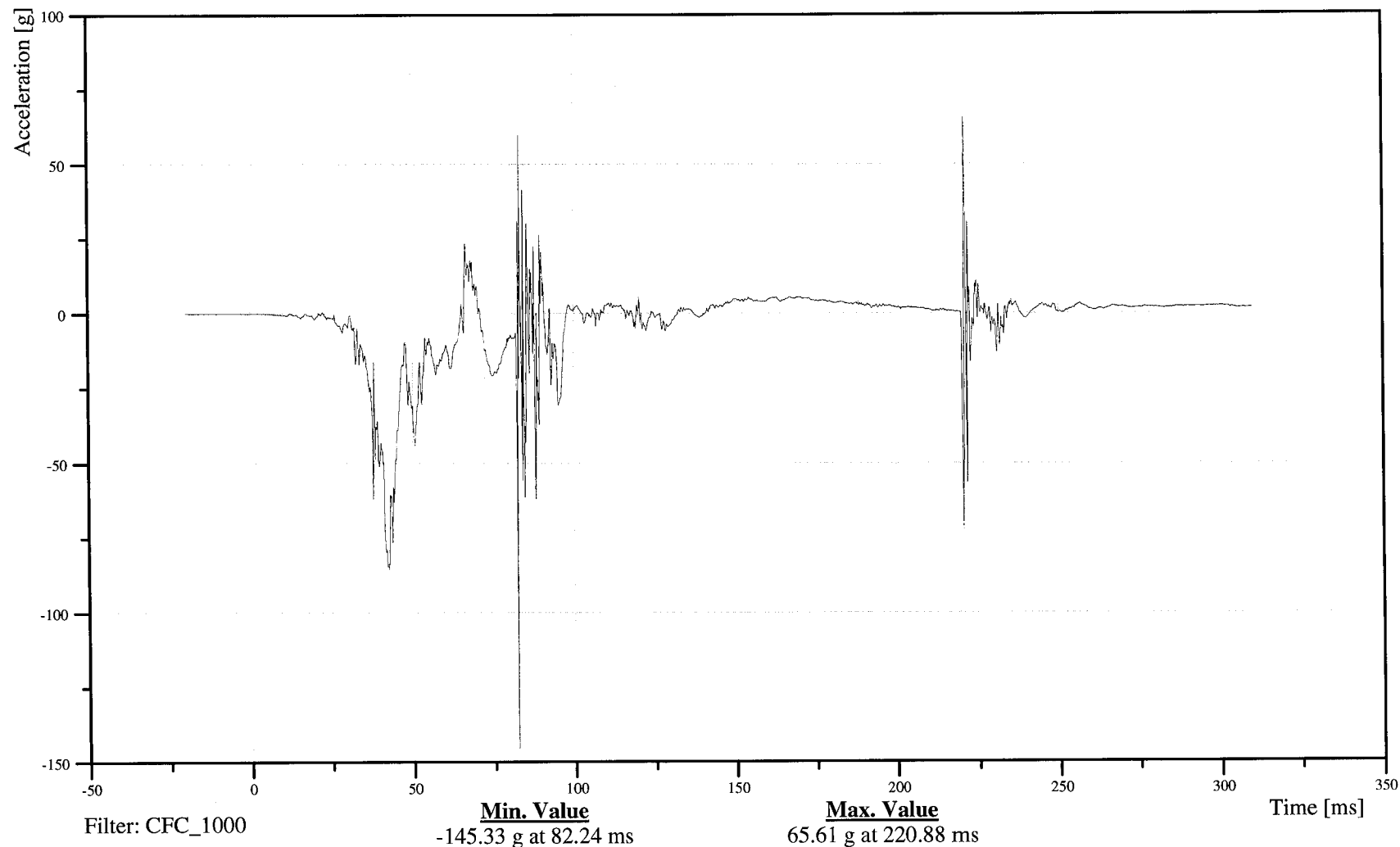
Customer: NHTSA

Test Number: C70509

16RIBSRU00SIACYA

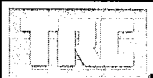
TRC Inc. Test Lab: CTF

Test Number: 070323



B-17

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

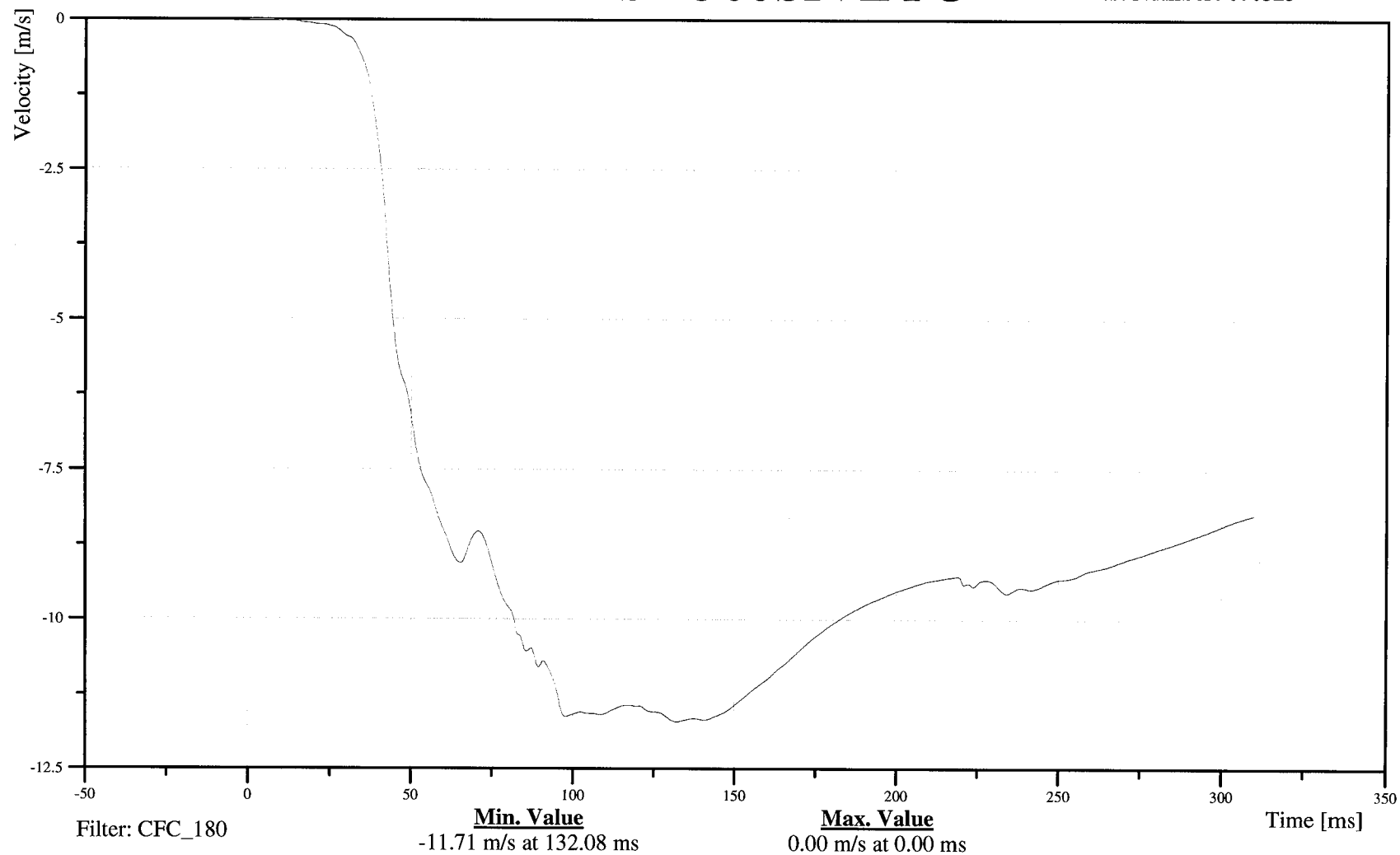
Date: 03/23/2007  
Time: 12:32

RIGHT REAR PASSENGER UPPER RIB Y-AXIS VELOCITY

Customer: NHTSA  
Test Number: C70509

16RIBSRU00SIVEYC

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-18

070323



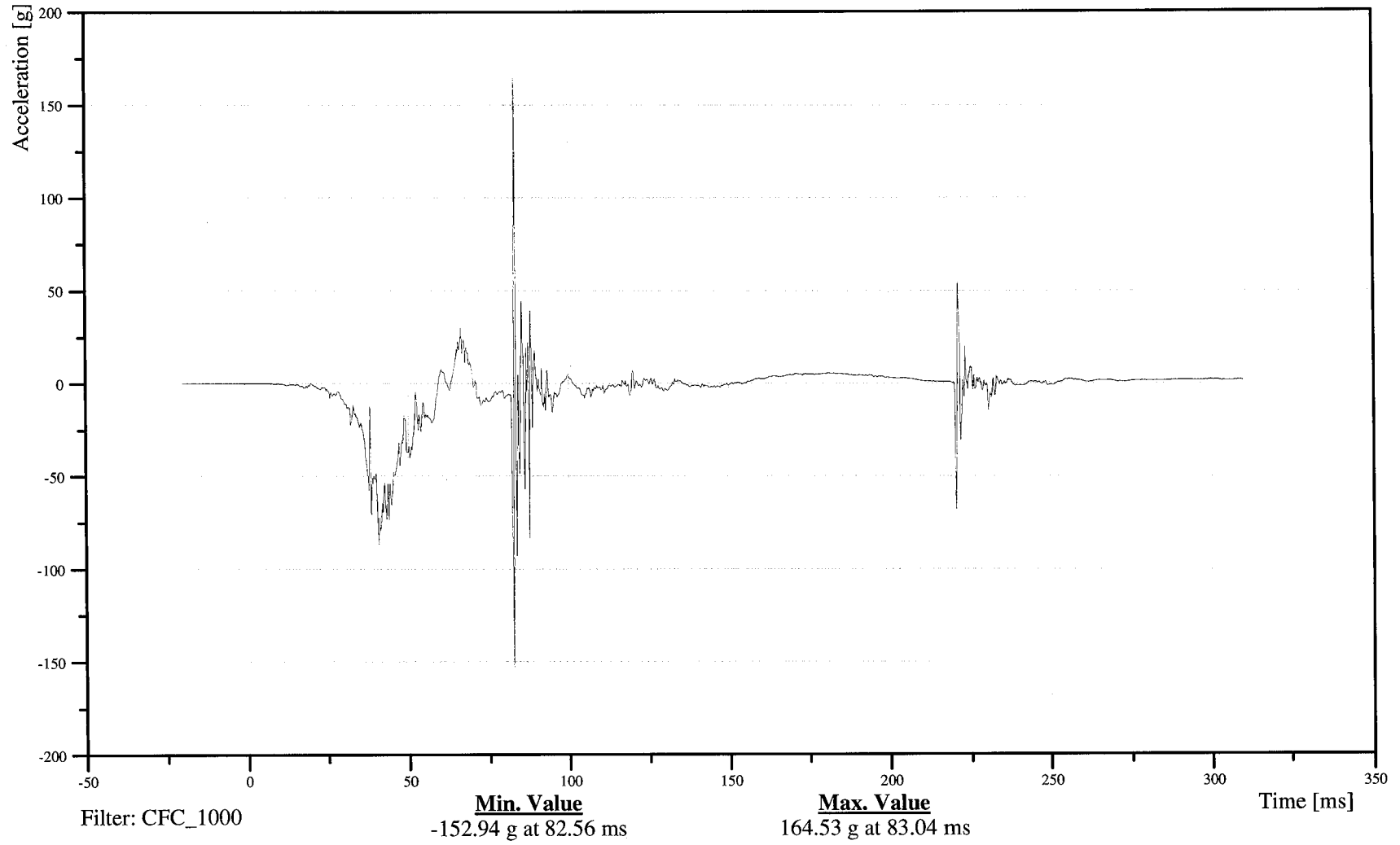
48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio  
RIGHT REAR PASSENGER LOWER RIB Y-AXIS ACCELERATION

Date: 03/23/2007  
Time: 12:32

Customer: NHTSA  
Test Number: C70509

16RIBSRL00SIACYA

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-19

070323





48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT REAR PASSENGER LOWER RIB Y-AXIS VELOCITY

Time: 12:32

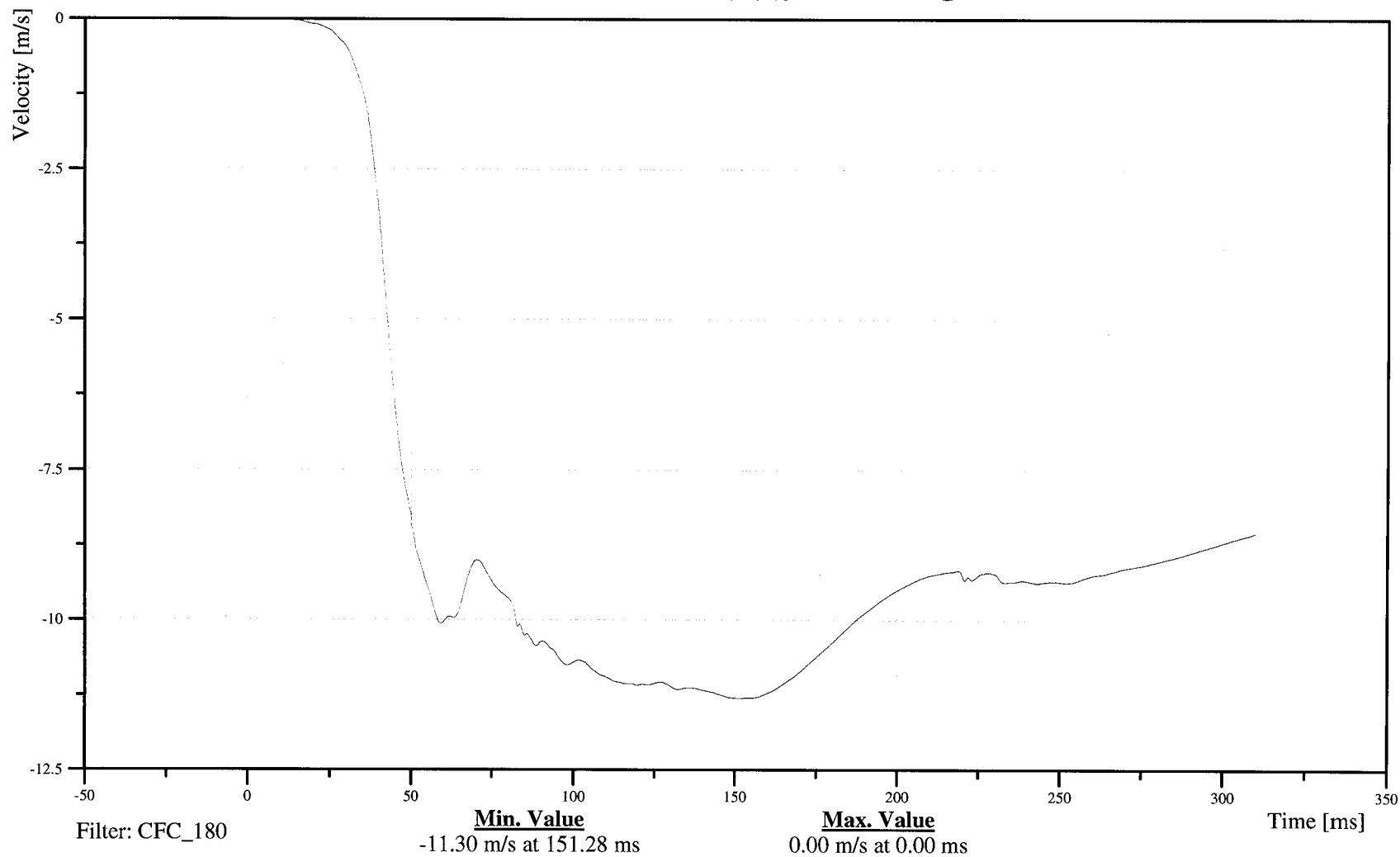
Customer: NHTSA

Test Number: C70509

16RIBSRL00SIVEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-20

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT REAR PASSENGER LOWER SPINE Y-AXIS ACCELERATION

Time: 12:32

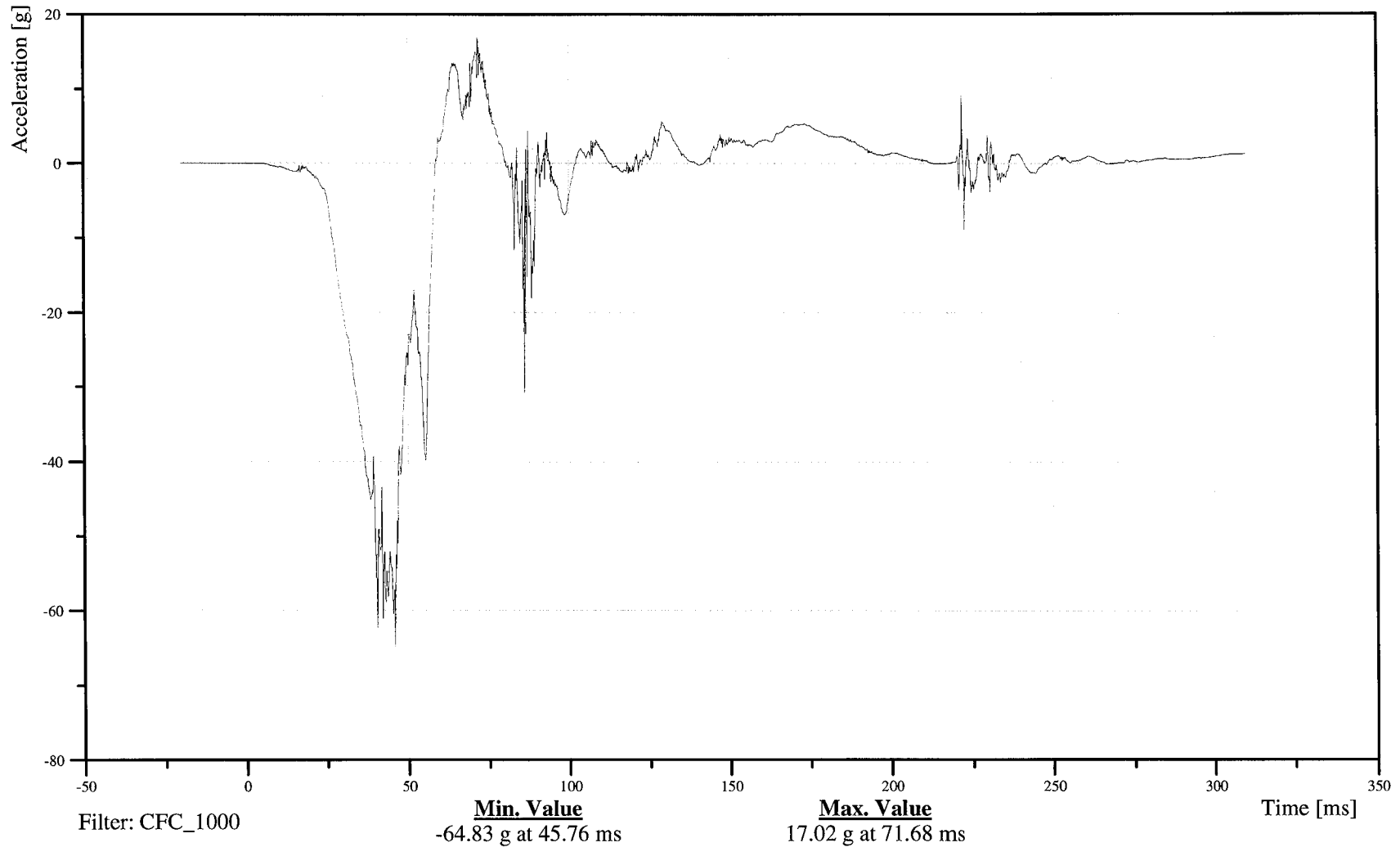
Customer: NHTSA

Test Number: C70509

16SPIN1200SIACYA

TRC Inc. Test Lab: CTF

Test Number: 070323



B-21

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT REAR PASSENGER LOWER SPINE Y-AXIS VELOCITY

Time: 12:32

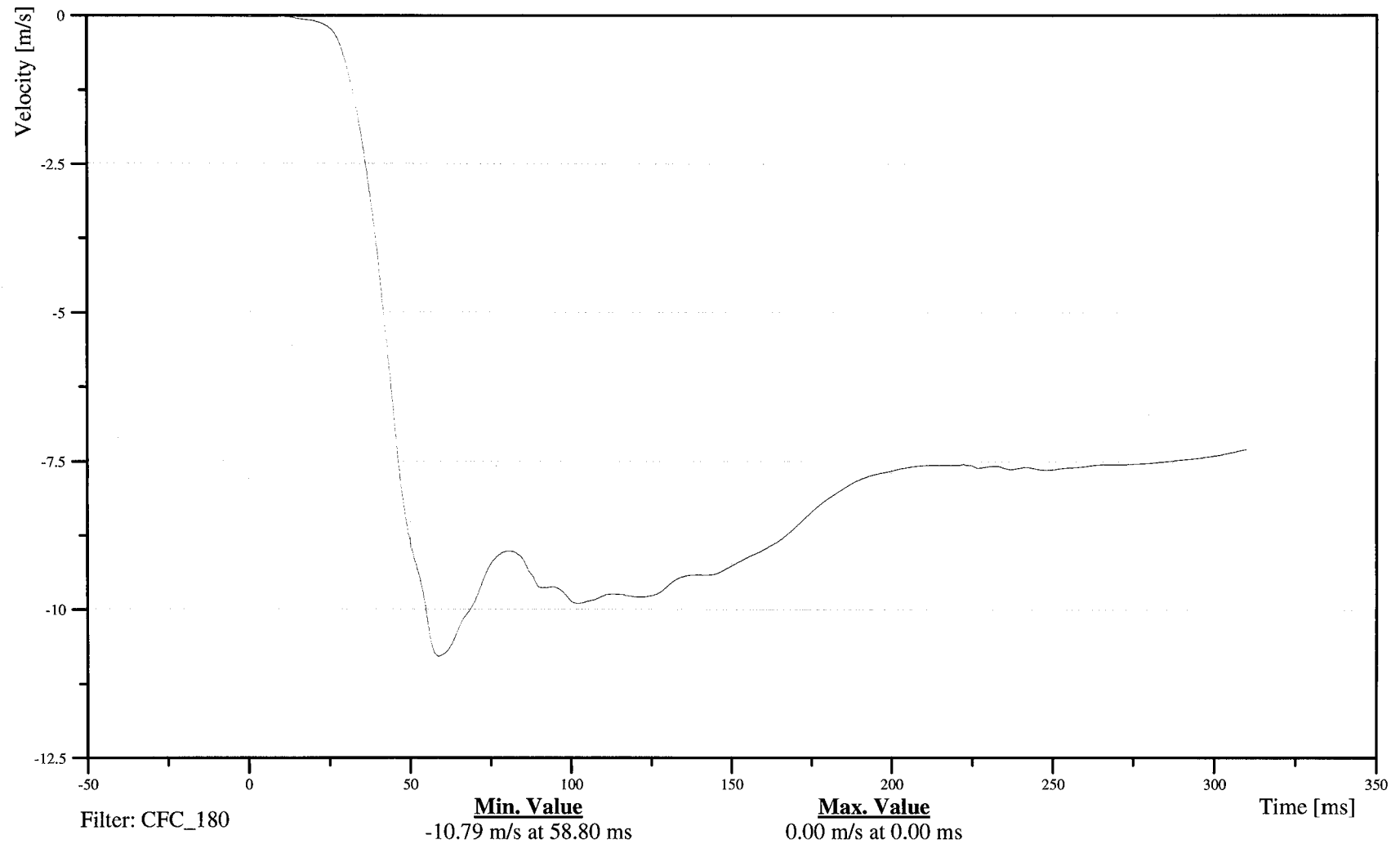
Customer: NHTSA

Test Number: C70509

16SPIN1200SIVEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-22

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

Time: 12:32

RIGHT REAR PASSENGER PELVIS Y-AXIS ACCELERATION

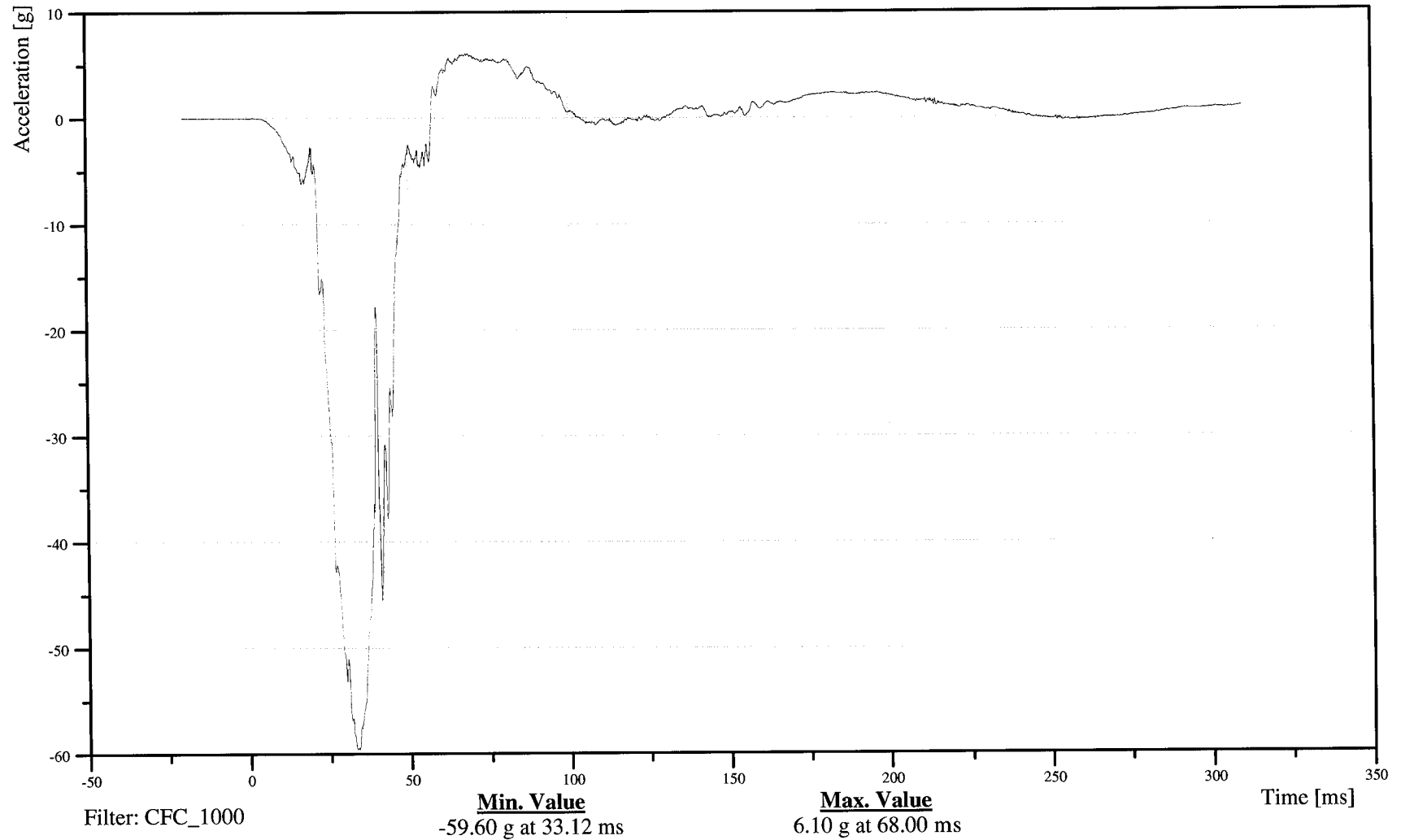
Customer: NHTSA

Test Number: C70509

16PELVCG00SIACYA

TRC Inc. Test Lab: CTF

Test Number: 070323



B-23

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

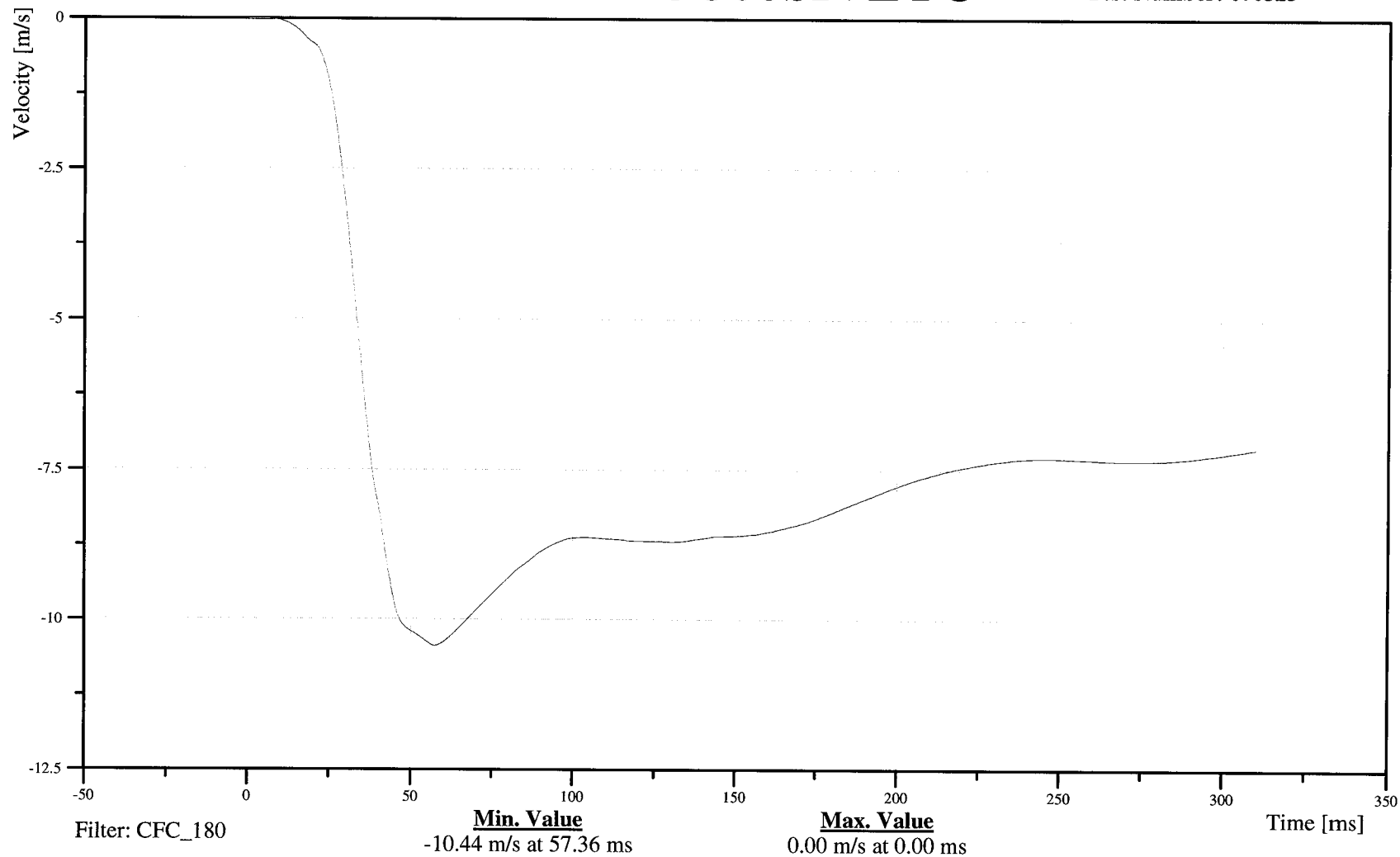
Date: 03/23/2007  
Time: 12:32

RIGHT REAR PASSENGER PELVIS Y-AXIS VELOCITY

Customer: NHTSA  
Test Number: C70509

16PELVCG00SIVEYC

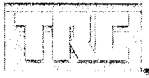
TRC Inc. Test Lab: CTF  
Test Number: 070323



B-24

070323

Right Front and Right Rear Passenger Dummy Redundant Instrumentation Plots



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER UPPER RIB Y-AXIS REDUNDANT ACCELERATION

Time: 12:32

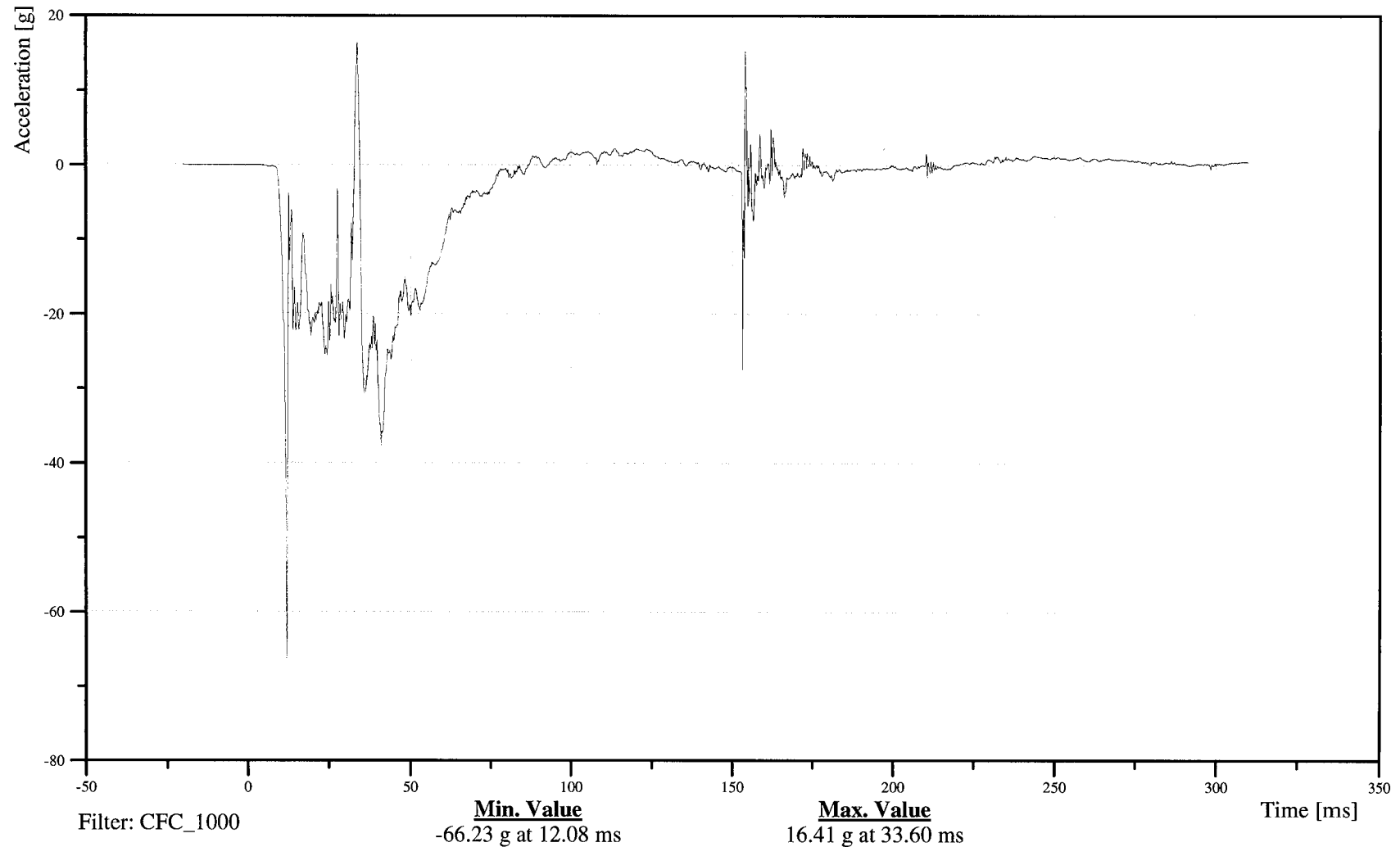
Customer: NHTSA

Test Number: C70509

13RIBSRURDSIACYA

TRC Inc. Test Lab: CTF

Test Number: 070323



B-26

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER UPPER RIB Y-AXIS REDUNDANT VELOCITY

Time: 12:32

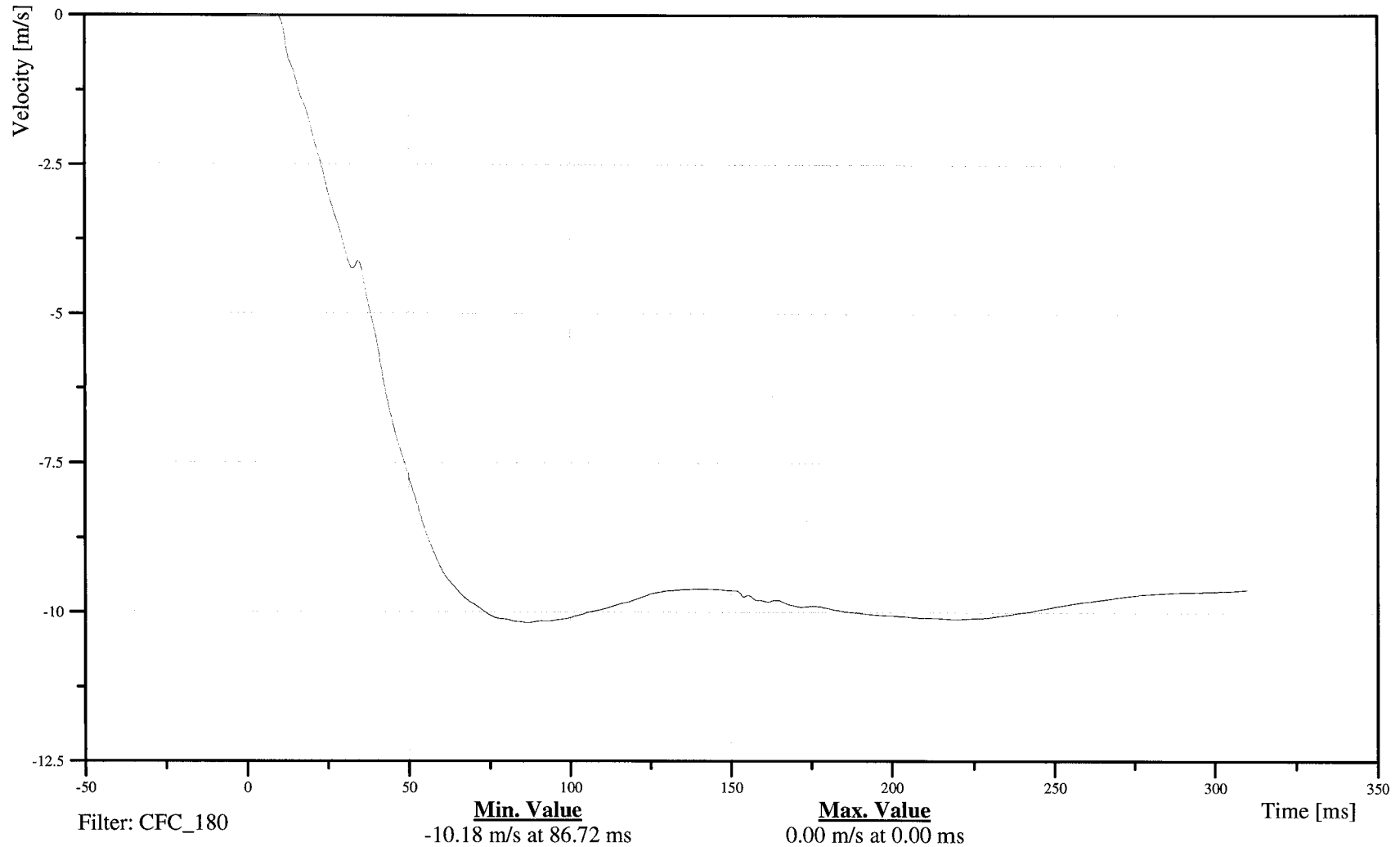
Customer: NHTSA

Test Number: C70509

13RIBSRURDSIVEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-27

070323





48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

Time: 12:32

RIGHT FRONT PASSENGER LOWER RIB Y-AXIS REDUNDANT ACCELERATION

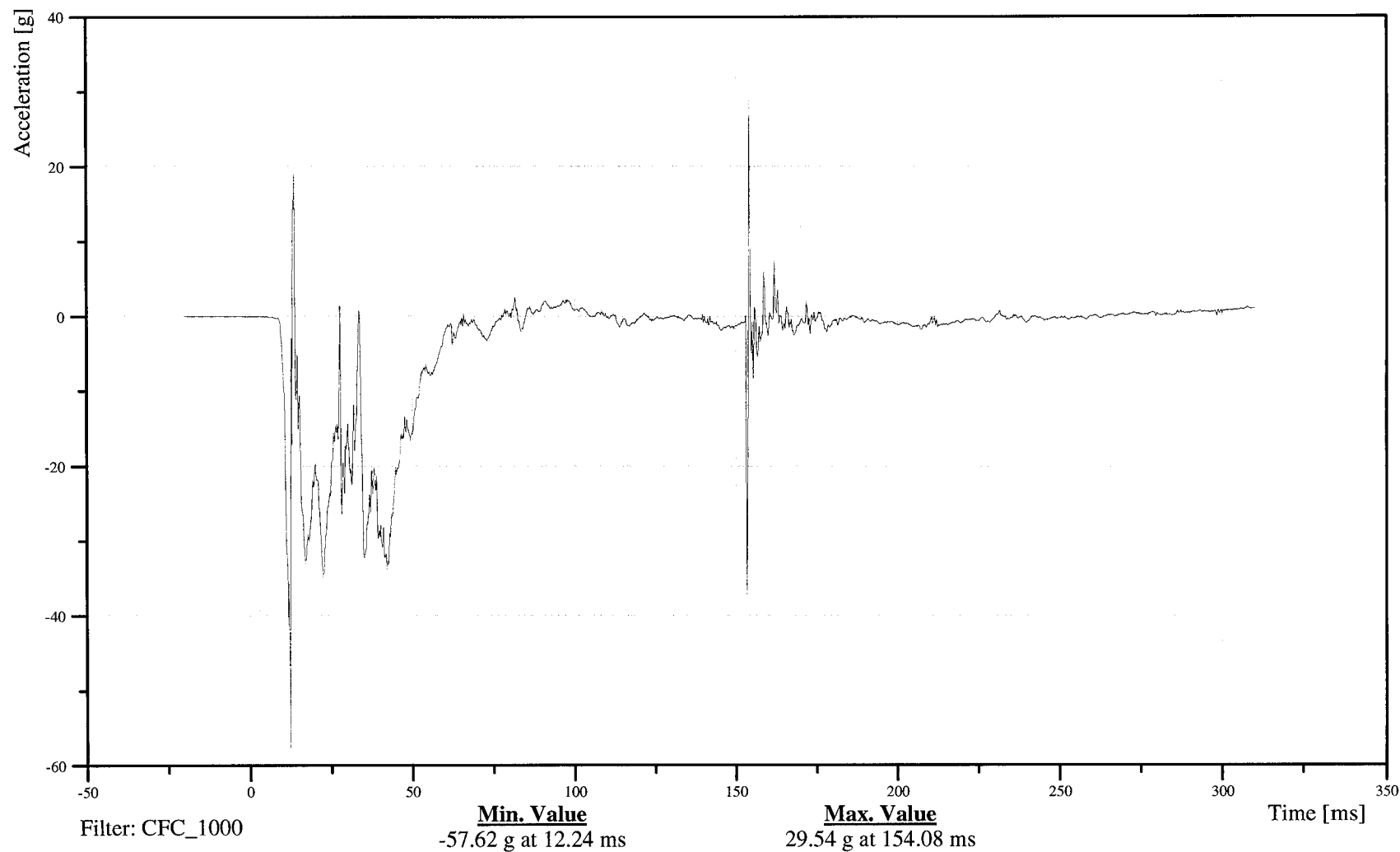
Customer: NHTSA

Test Number: C70509

13RIBSRLRDSIACYA

TRC Inc. Test Lab: CTF

Test Number: 070323



B-28

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER LOWER RIB Y-AXIS REDUNDANT VELOCITY

Time: 12:32

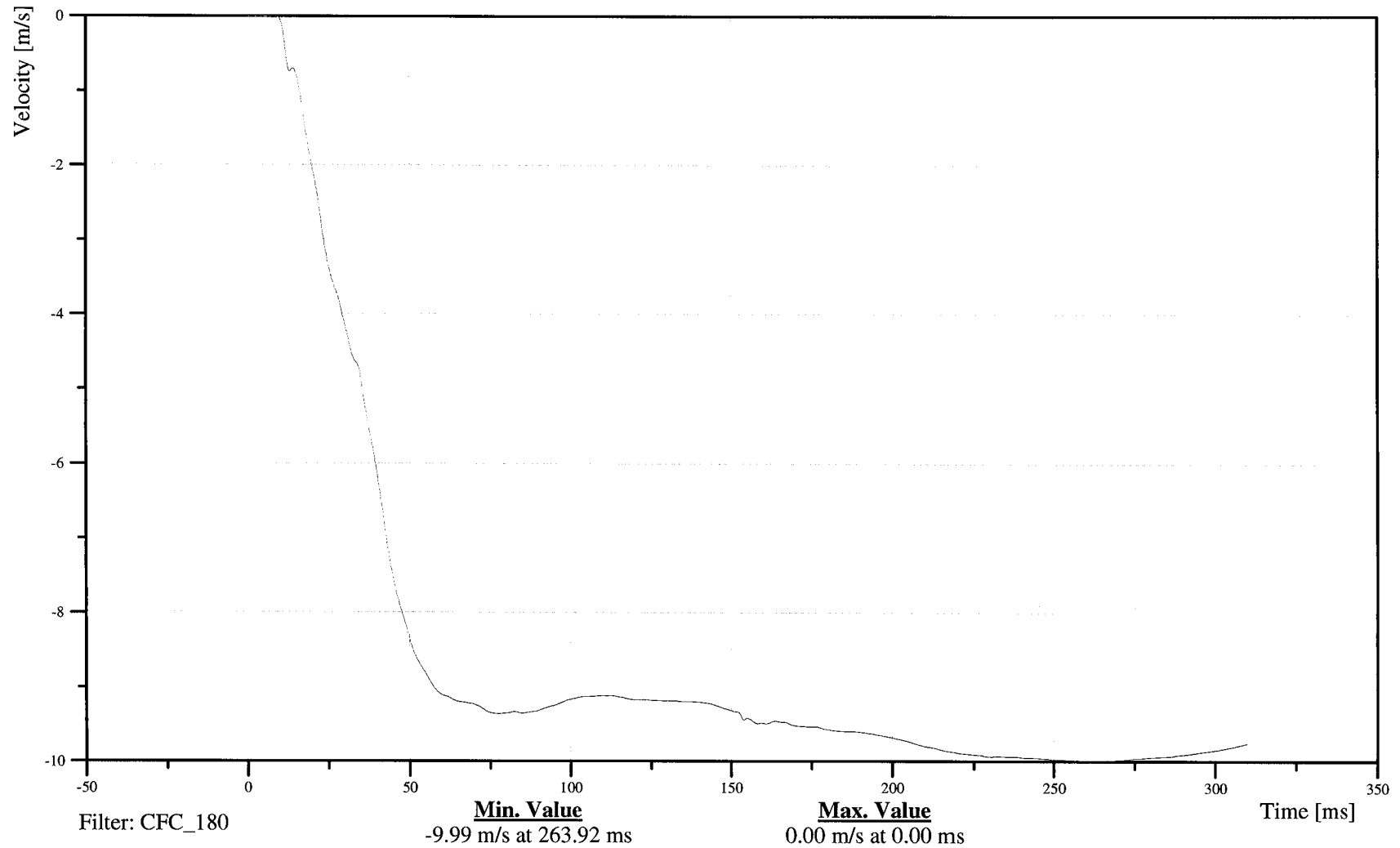
Customer: NHTSA

Test Number: C70509

13RIBSRLRDSIVEYC

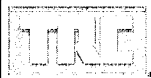
TRC Inc. Test Lab: CTF

Test Number: 070323



B-29

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER LOWER SPINE Y-AXIS REDUNDANT ACCELERATION

Time: 12:32

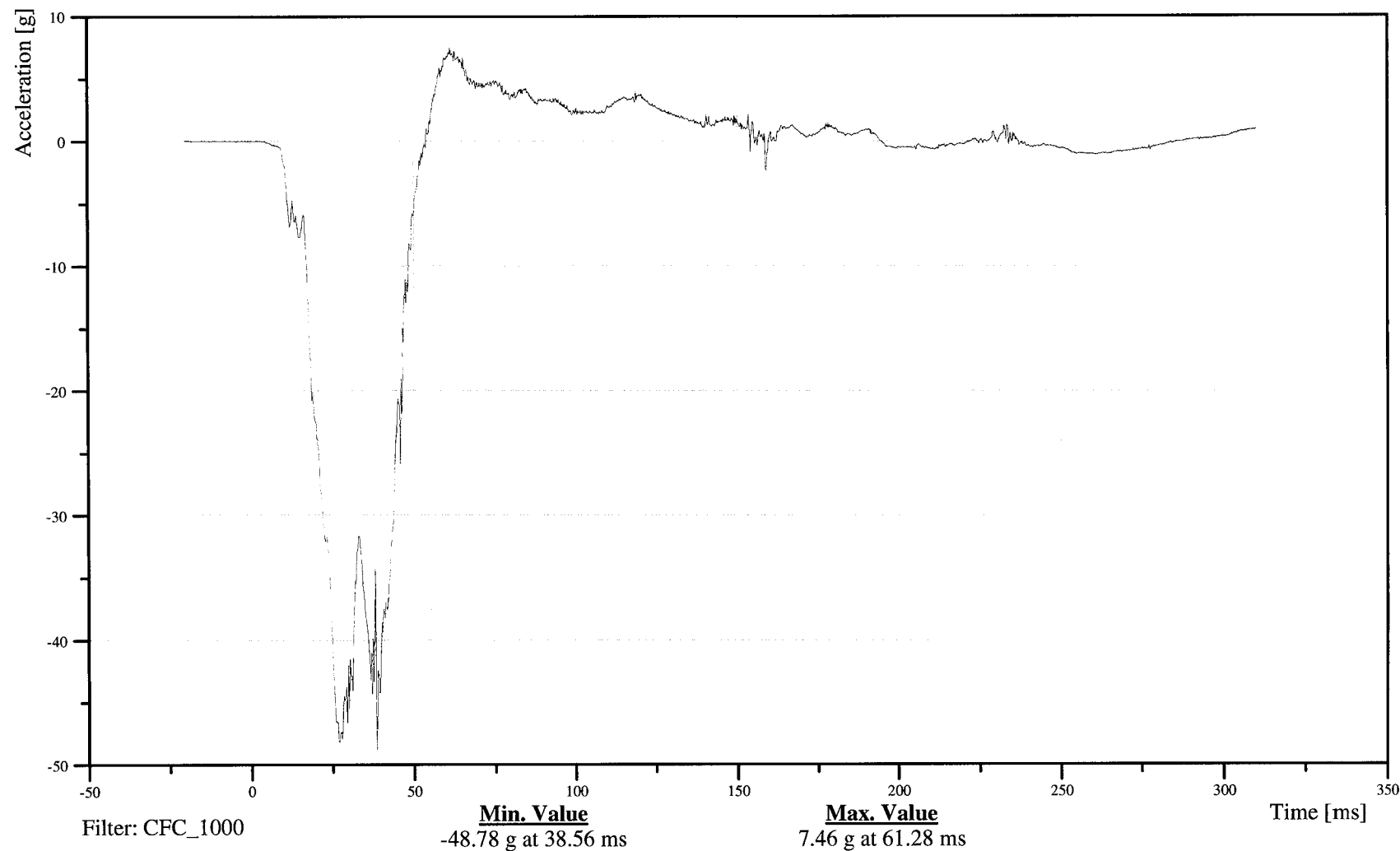
Customer: NHTSA

Test Number: C70509

13SPIN12RDSIACYA

TRC Inc. Test Lab: CTF

Test Number: 070323



B-30

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT PASSENGER LOWER SPINE Y-AXIS REDUNDANT VELOCITY

Time: 12:32

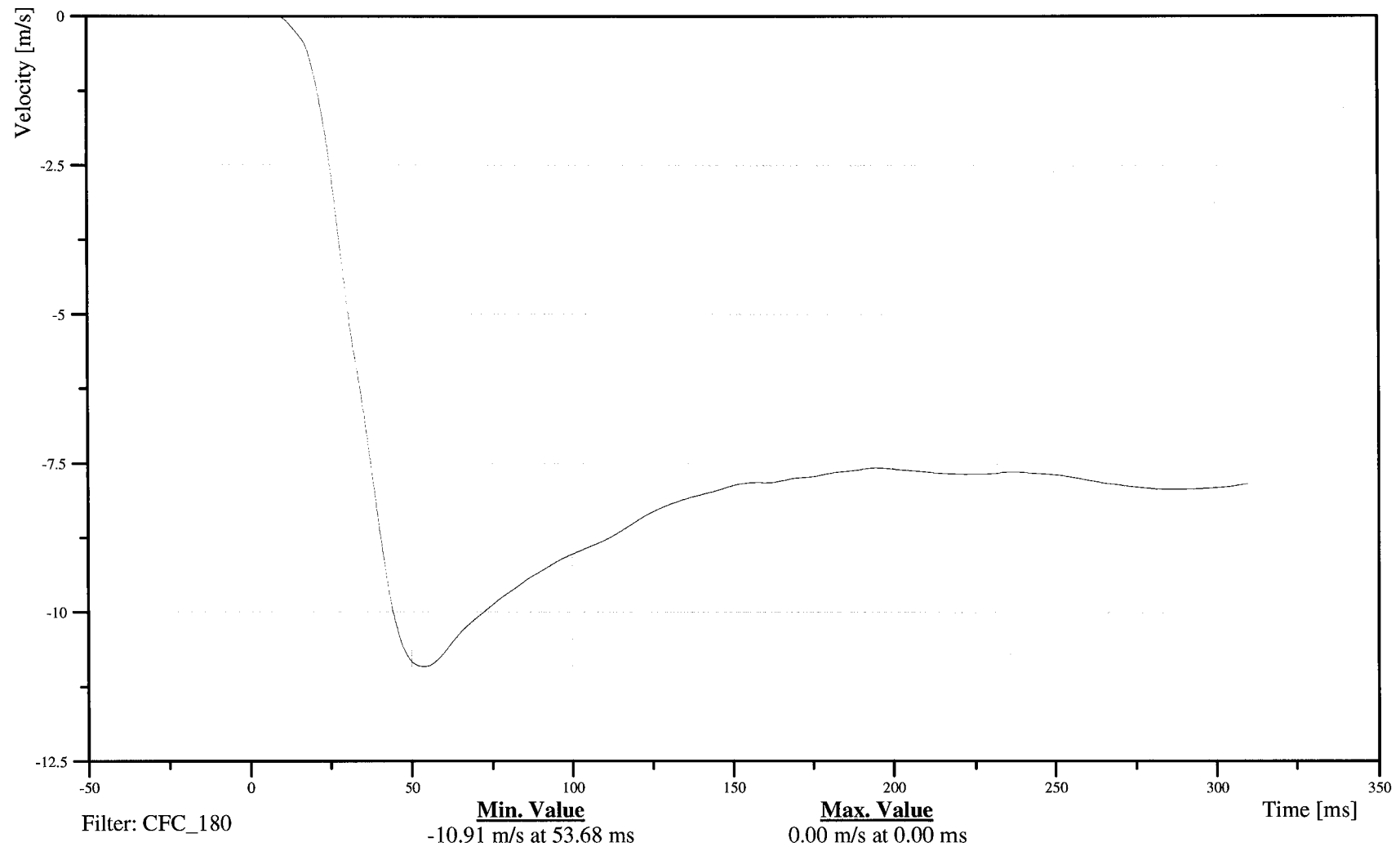
Customer: NHTSA

Test Number: C70509

13SPIN12RDSIVEYC

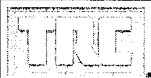
TRC Inc. Test Lab: CTF

Test Number: 070323



B-31

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT REAR PASSENGER UPPER RIB Y-AXIS REDUNDANT ACCELERATION

Time: 12:32

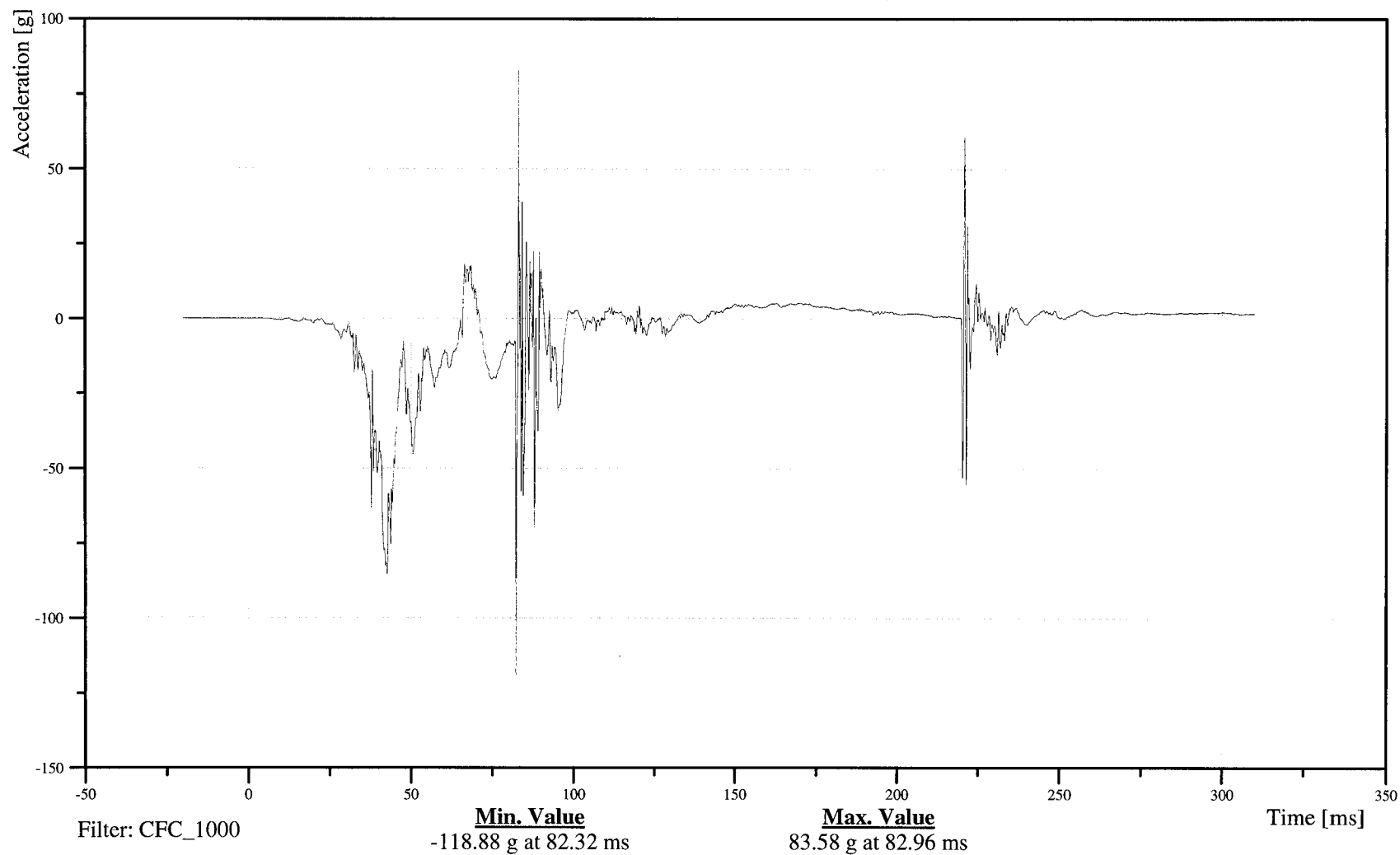
Customer: NHTSA

Test Number: C70509

16RIBSRURDSIACYA

TRC Inc. Test Lab: CTF

Test Number: 070323



B-32

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

Time: 12:32

RIGHT REAR PASSENGER UPPER RIB Y-AXIS REDUNDANT VELOCITY

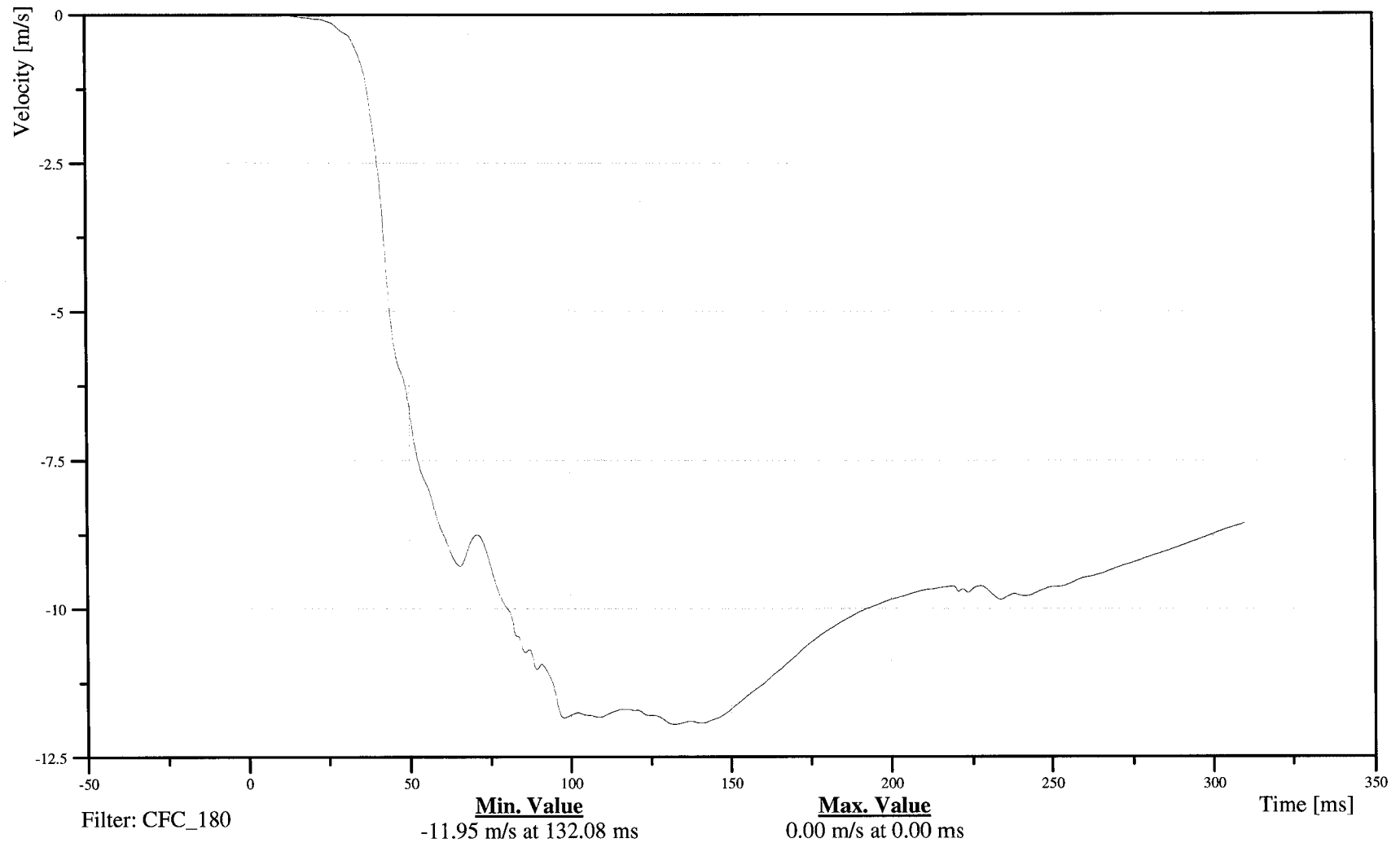
Customer: NHTSA

Test Number: C70509

16RIBSRURDSIVEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-33

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT REAR PASSENGER LOWER RIB Y-AXIS REDUNDANT ACCELERATION

Time: 12:32

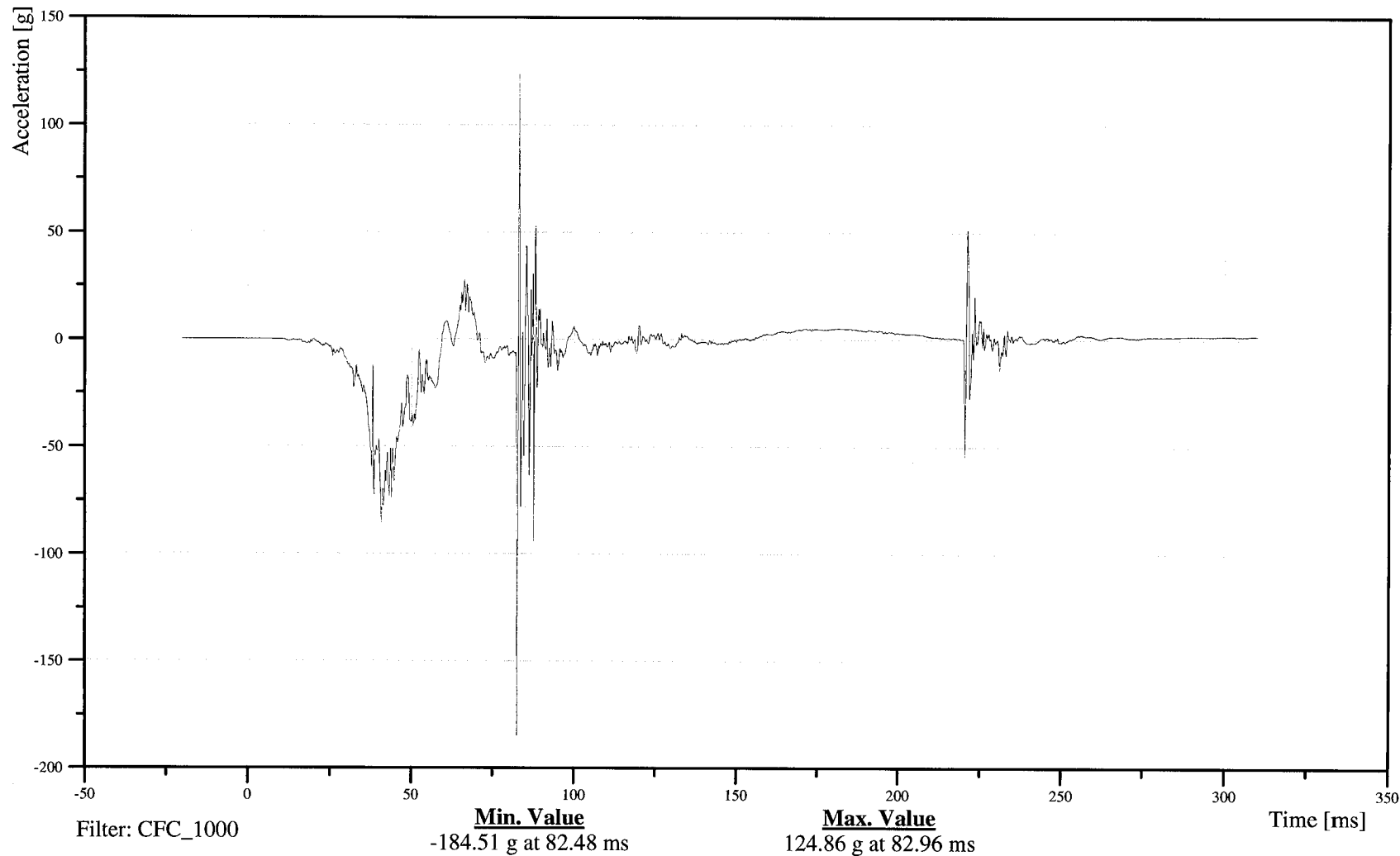
Customer: NHTSA

Test Number: C70509

16RIBSRLRDSIACYA

TRC Inc. Test Lab: CTF

Test Number: 070323



B-34

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT REAR PASSENGER LOWER RIB Y-AXIS REDUNDANT VELOCITY

Time: 12:32

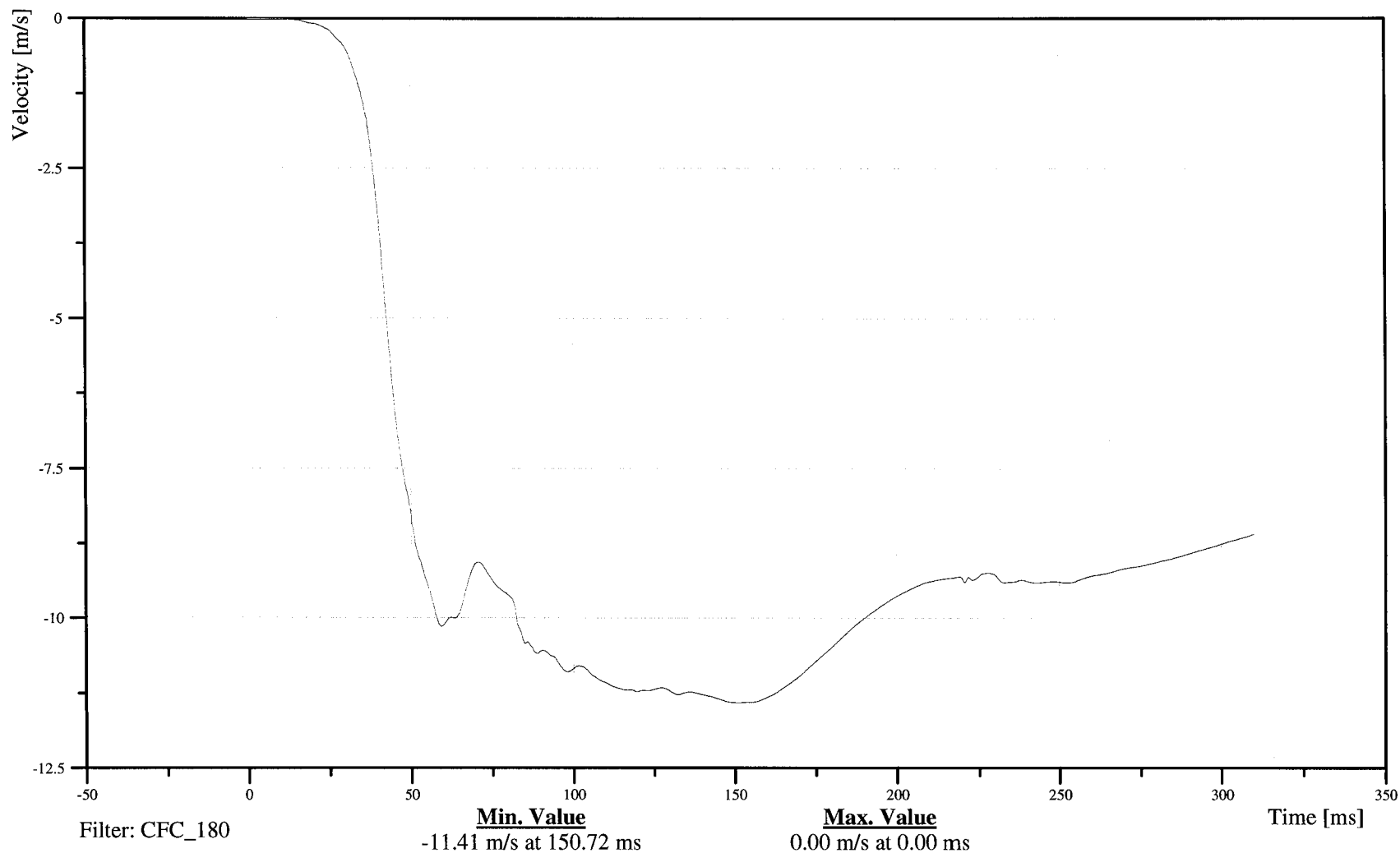
Customer: NHTSA

Test Number: C70509

16RIBSRLRDSIVEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-35

070323





48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT REAR PASSENGER LOWER SPINE Y-AXIS REDUNDANT ACCELERATION

Time: 12:32

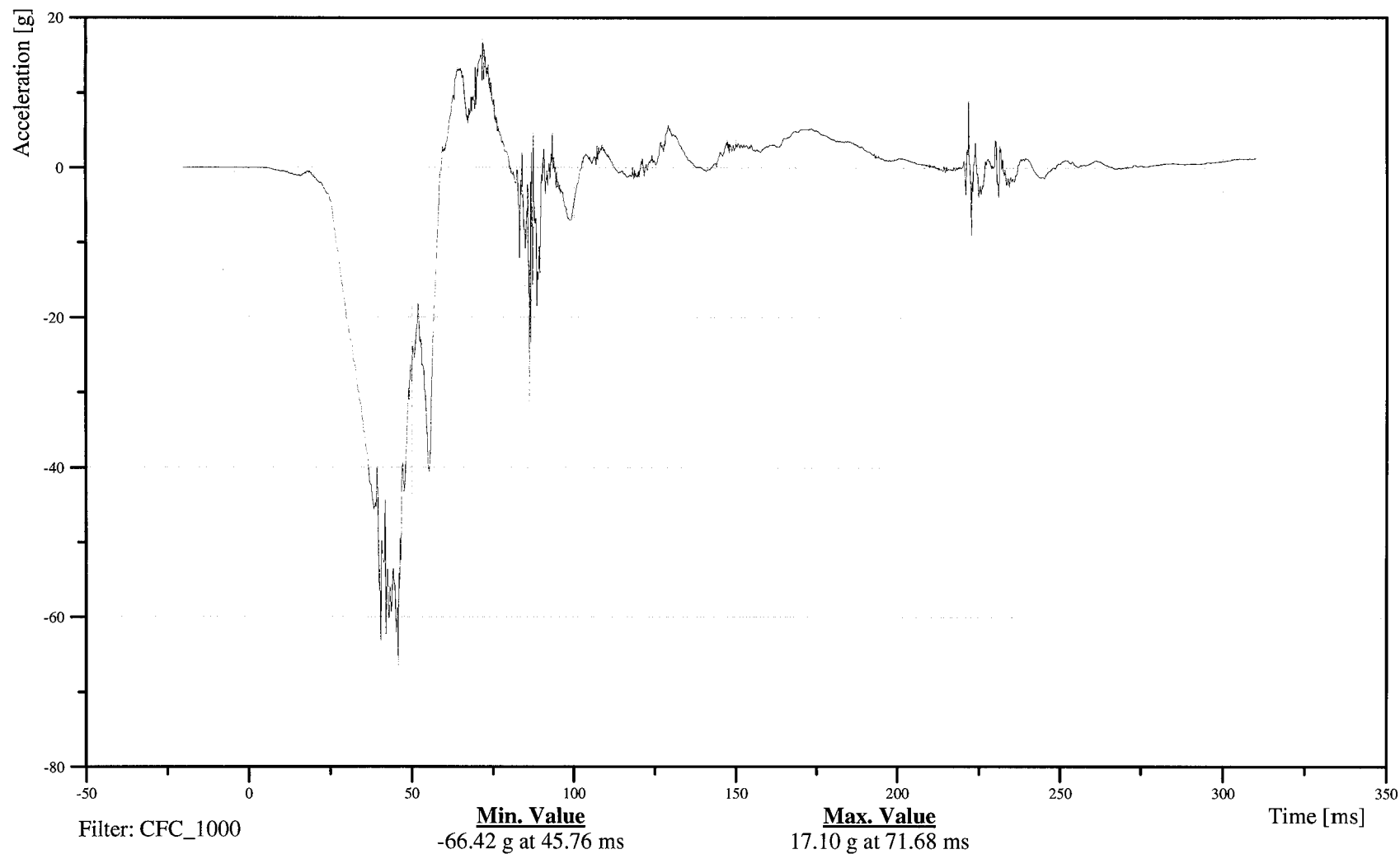
Customer: NHTSA

Test Number: C70509

16SPIN12RDSIACYA

TRC Inc. Test Lab: CTF

Test Number: 070323



B-36

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT REAR PASSENGER LOWER SPINE Y-AXIS REDUNDANT VELOCITY

Time: 12:32

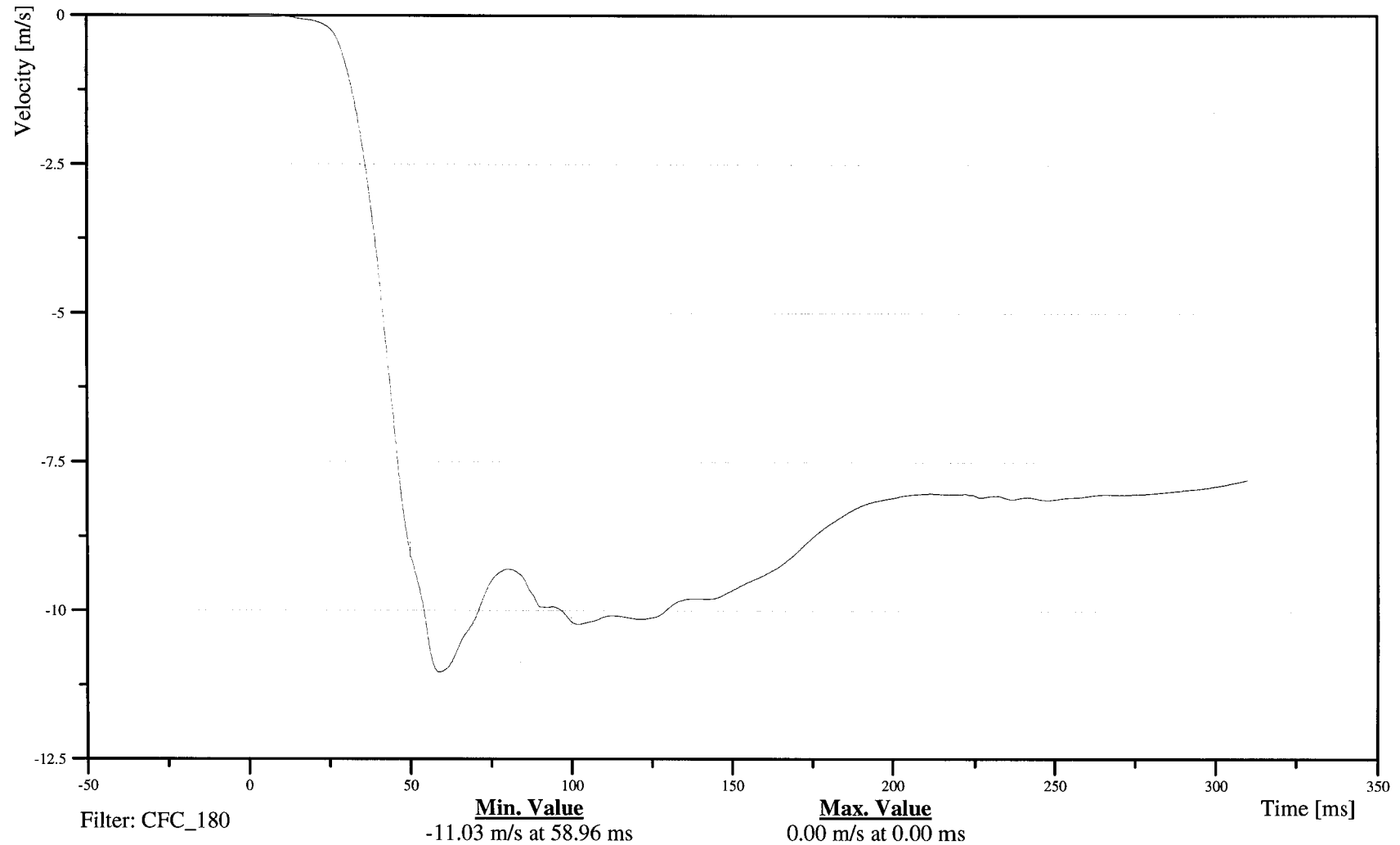
Customer: NHTSA

Test Number: C70509

16SPIN12RDSIVEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-37

070323

## Test Vehicle Instrumentation Plots



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT SIDE SILL AT FRONT SEAT X-AXIS ACCELERATION

Time: 12:32

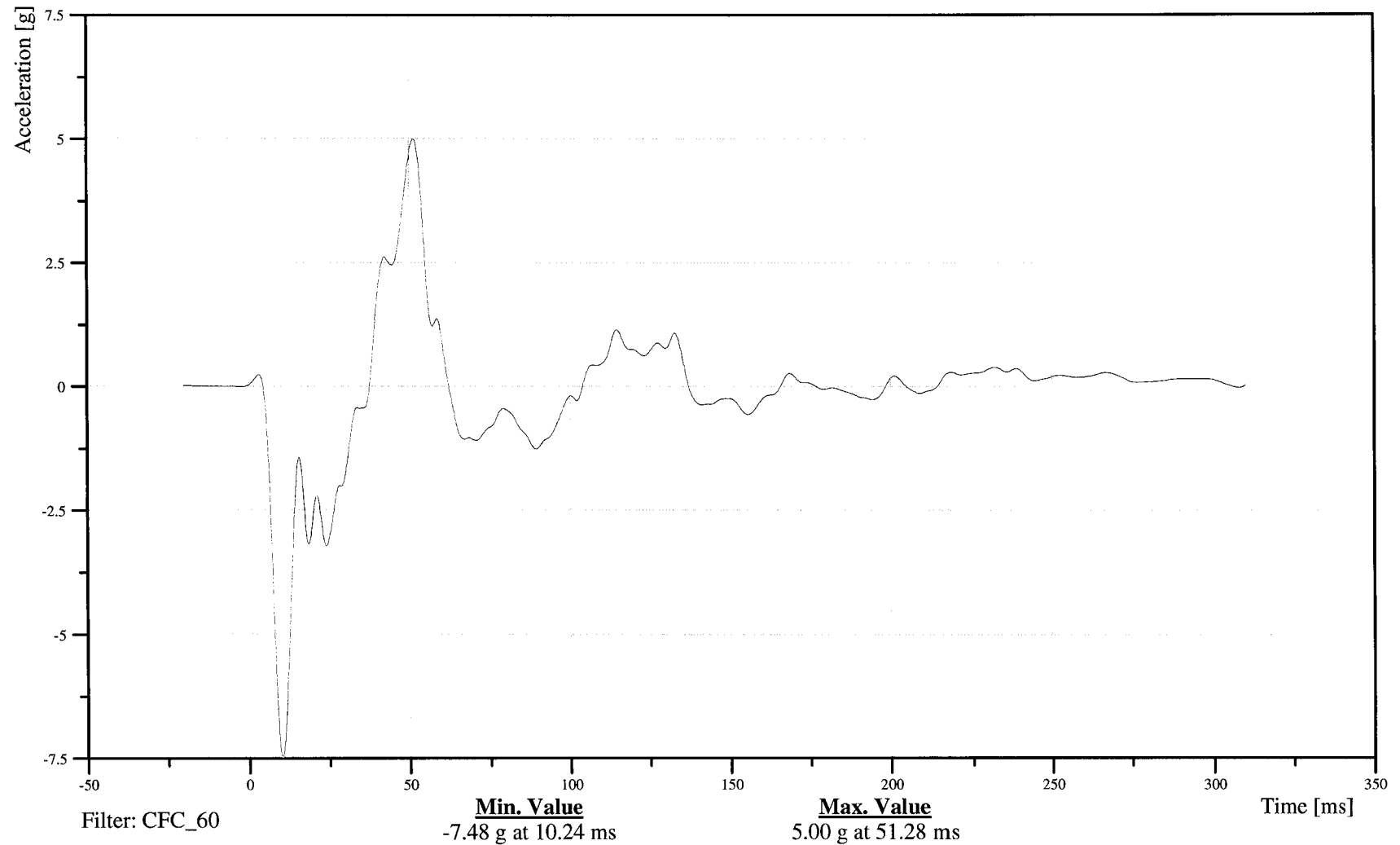
Customer: NHTSA

Test Number: C70509

14SILBFR0000ACXD

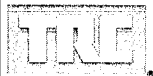
TRC Inc. Test Lab: CTF

Test Number: 070323



B-39

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

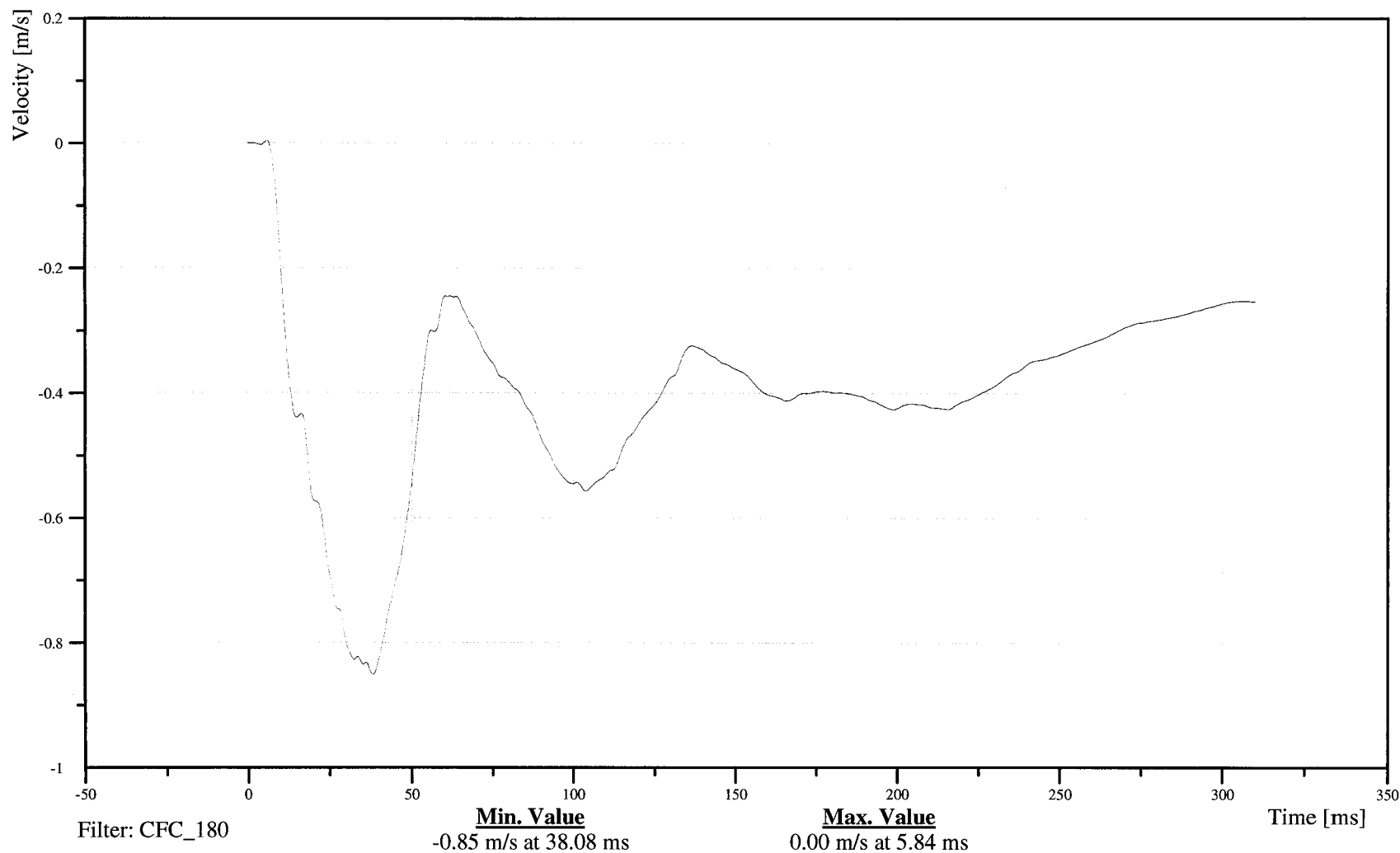
Date: 03/23/2007  
Time: 12:32

LEFT SIDE SILL AT FRONT SEAT X-AXIS VELOCITY

Customer: NHTSA  
Test Number: C70509

14SILBFR0000VEXC

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-40

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

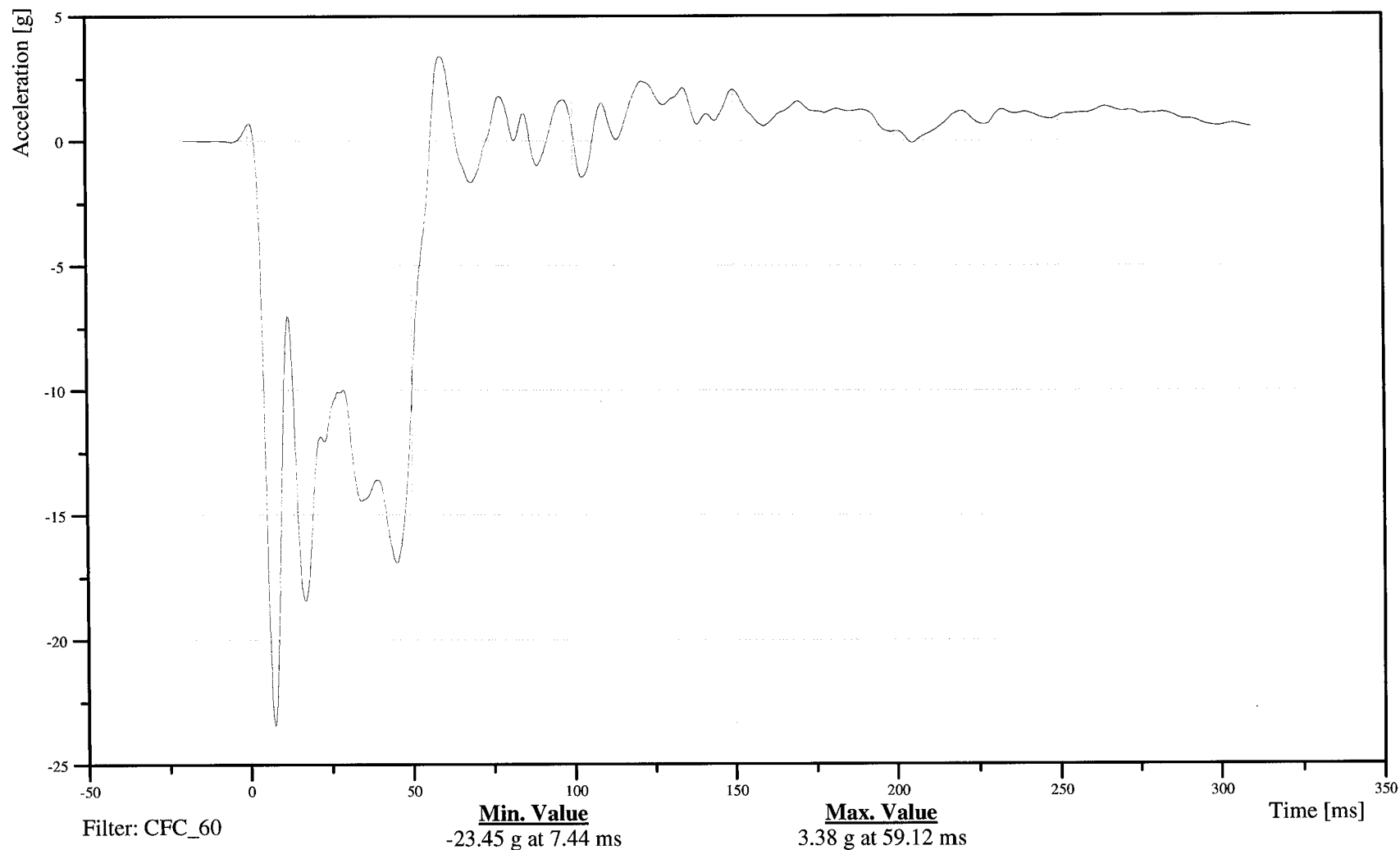
LEFT SIDE SILL AT FRONT SEAT Y-AXIS ACCELERATION

Time: 12:32

Customer: NHTSA  
Test Number: C70509

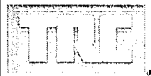
14SILBFR0000ACYD

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-41

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT SIDE SILL AT FRONT SEAT Y-AXIS VELOCITY

Time: 12:32

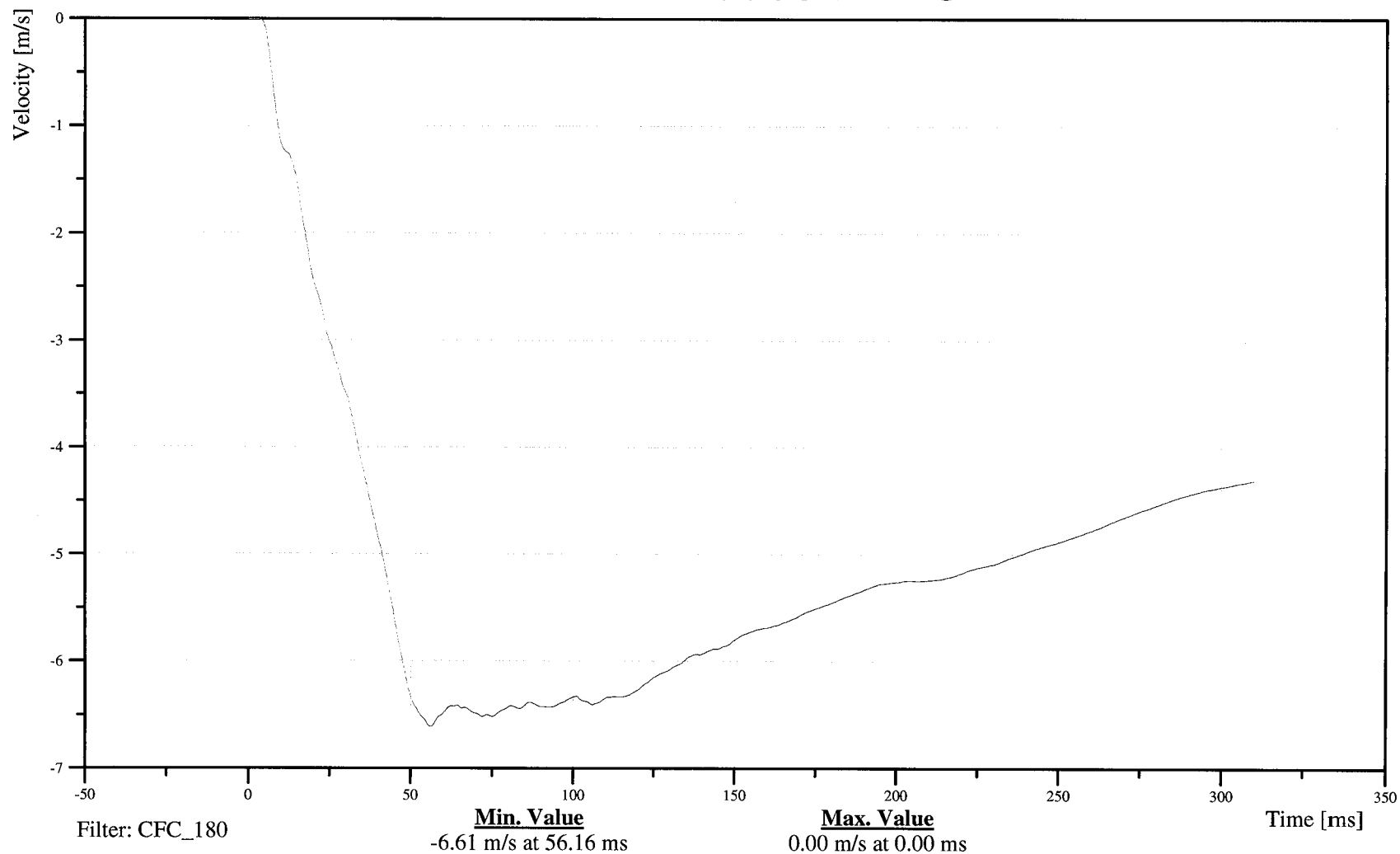
Customer: NHTSA

Test Number: C70509

14SILBFR0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-42

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT SIDE SILL AT FRONT SEAT Z-AXIS ACCELERATION

Time: 12:32

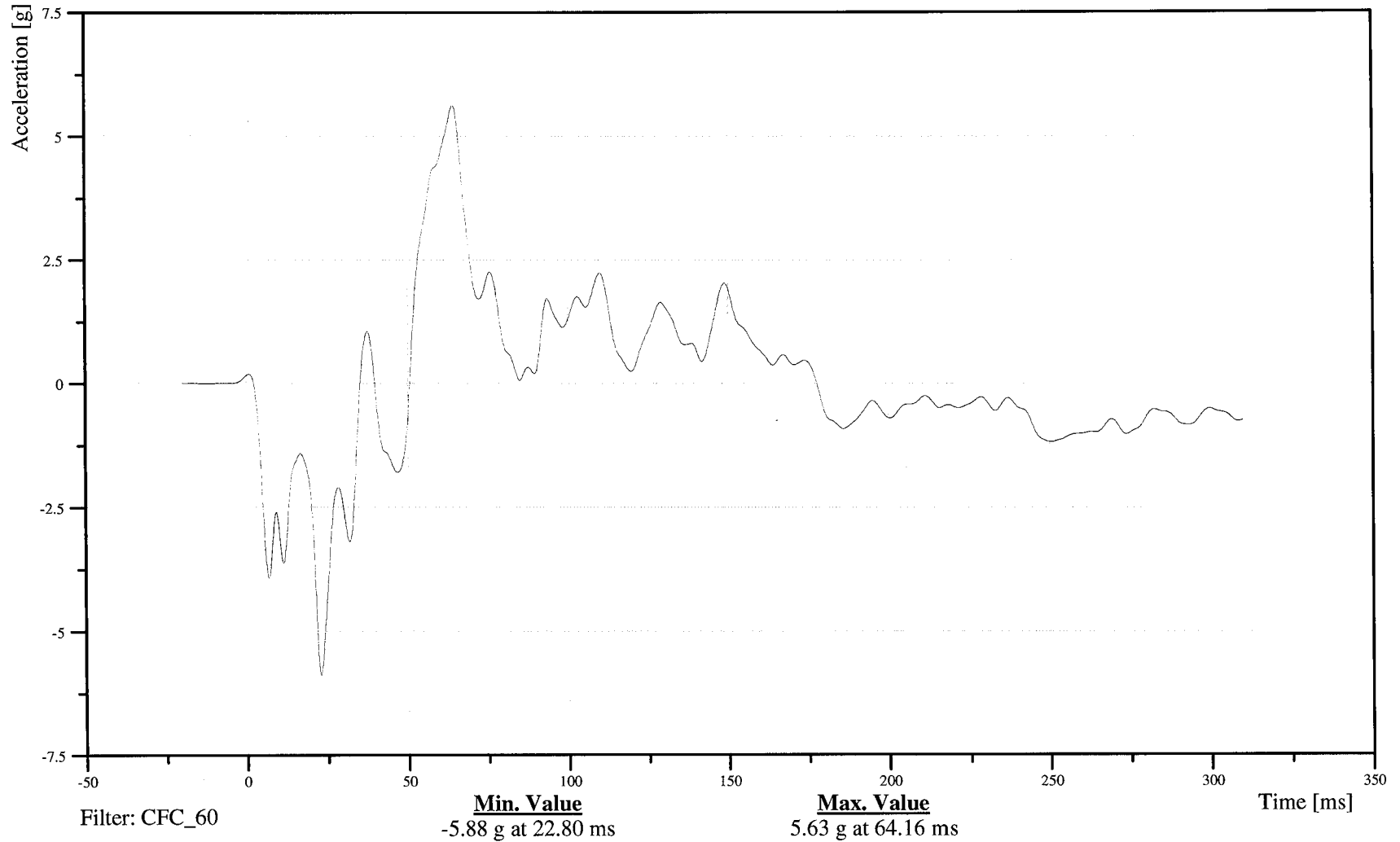
Customer: NHTSA

Test Number: C70509

14SILBFR0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-43

070323





48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT SIDE SILL AT FRONT SEAT Z-AXIS VELOCITY

Time: 12:32

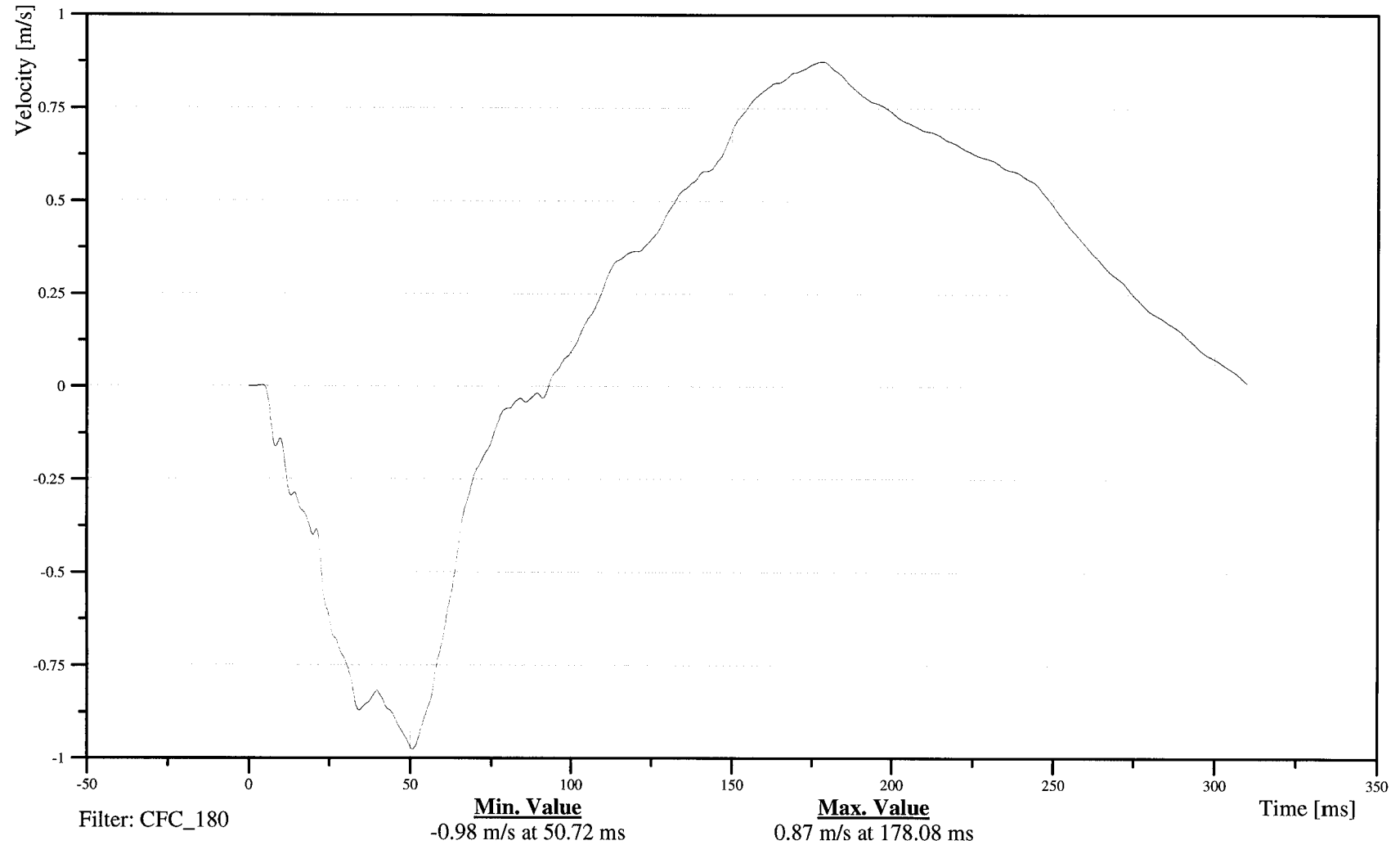
Customer: NHTSA

Test Number: C70509

14SILBFR0000VEZC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-44

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION

Time: 12:32

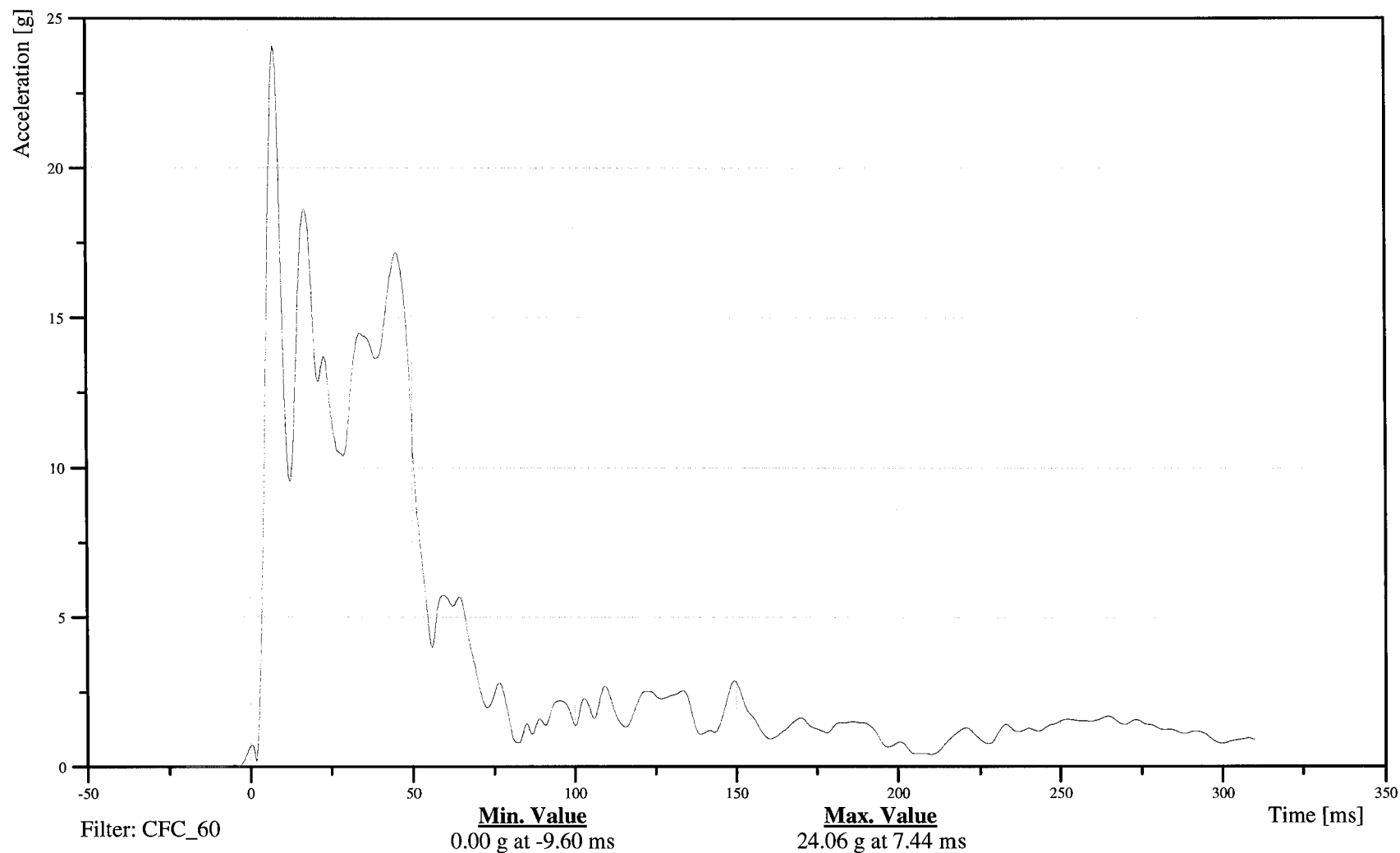
Customer: NHTSA

Test Number: C70509

14SILBFR0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-45

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT SIDE SILL AT REAR SEAT X-AXIS ACCELERATION

Time: 12:32

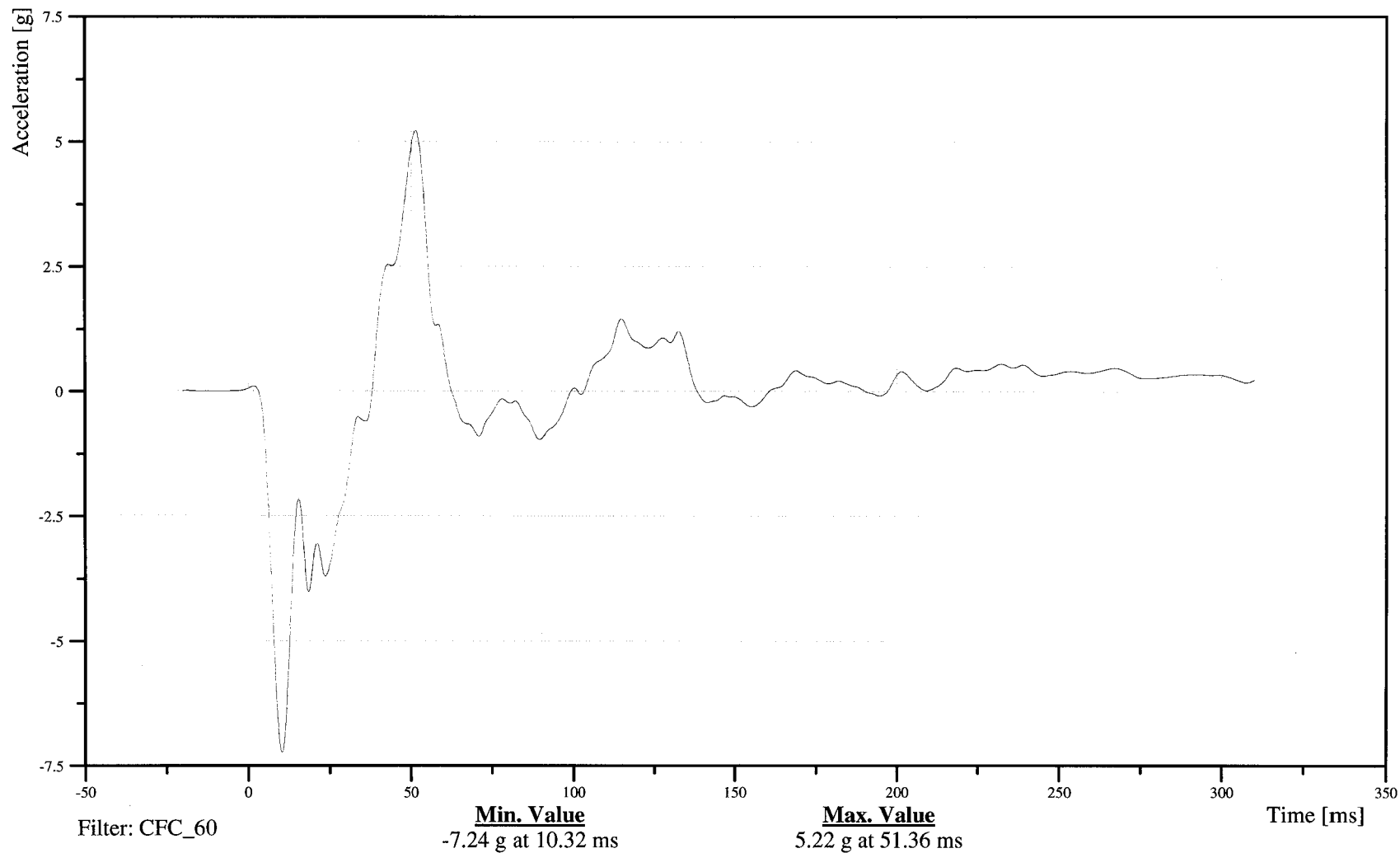
Customer: NHTSA

Test Number: C70509

14SILBRE0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-46

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

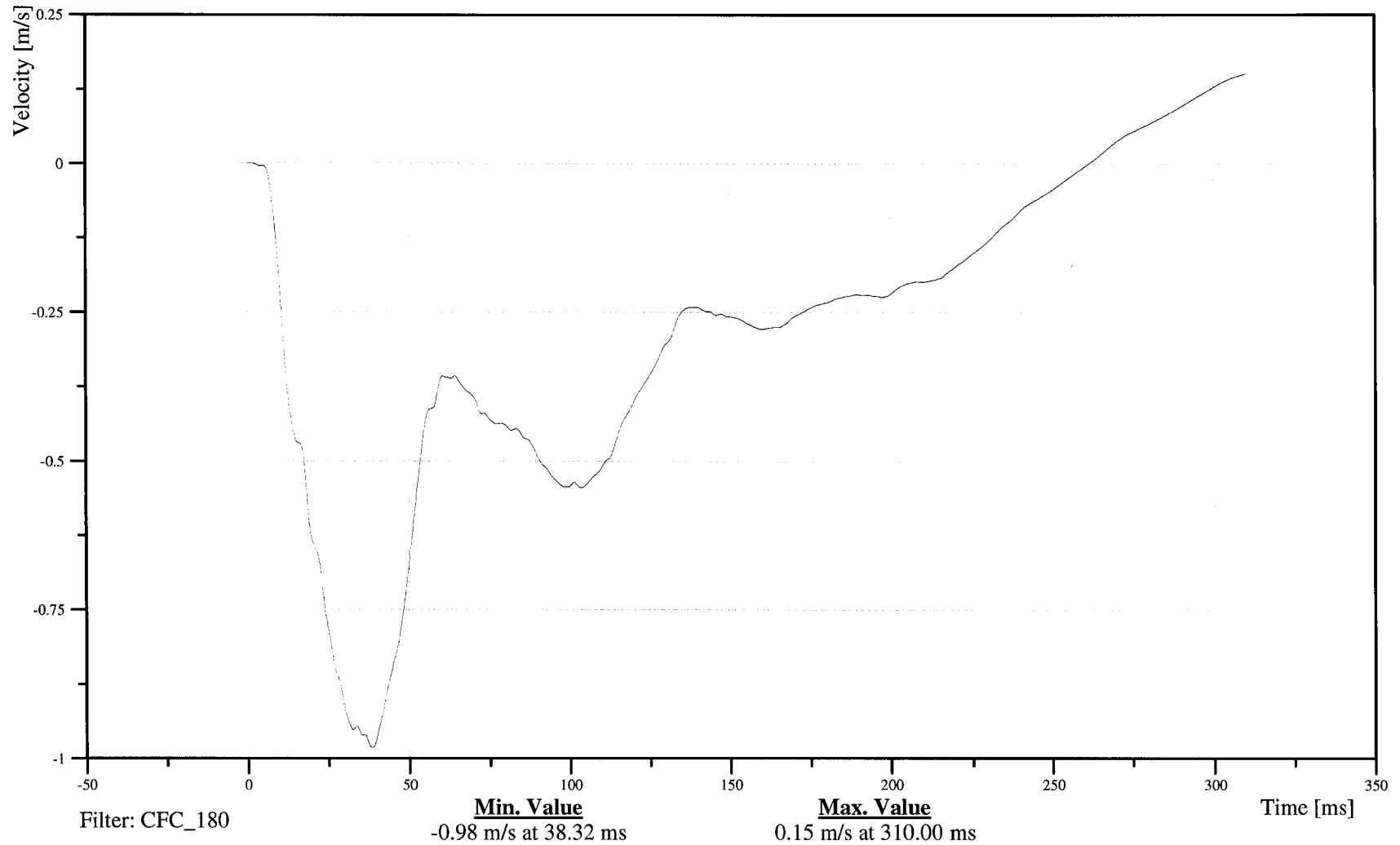
LEFT SIDE SILL AT REAR SEAT X-AXIS VELOCITY

Time: 12:32

Customer: NHTSA  
Test Number: C70509

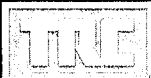
14SILBRE0000VEXC

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-47

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT SIDE SILL AT REAR SEAT Y-AXIS ACCELERATION

Time: 12:32

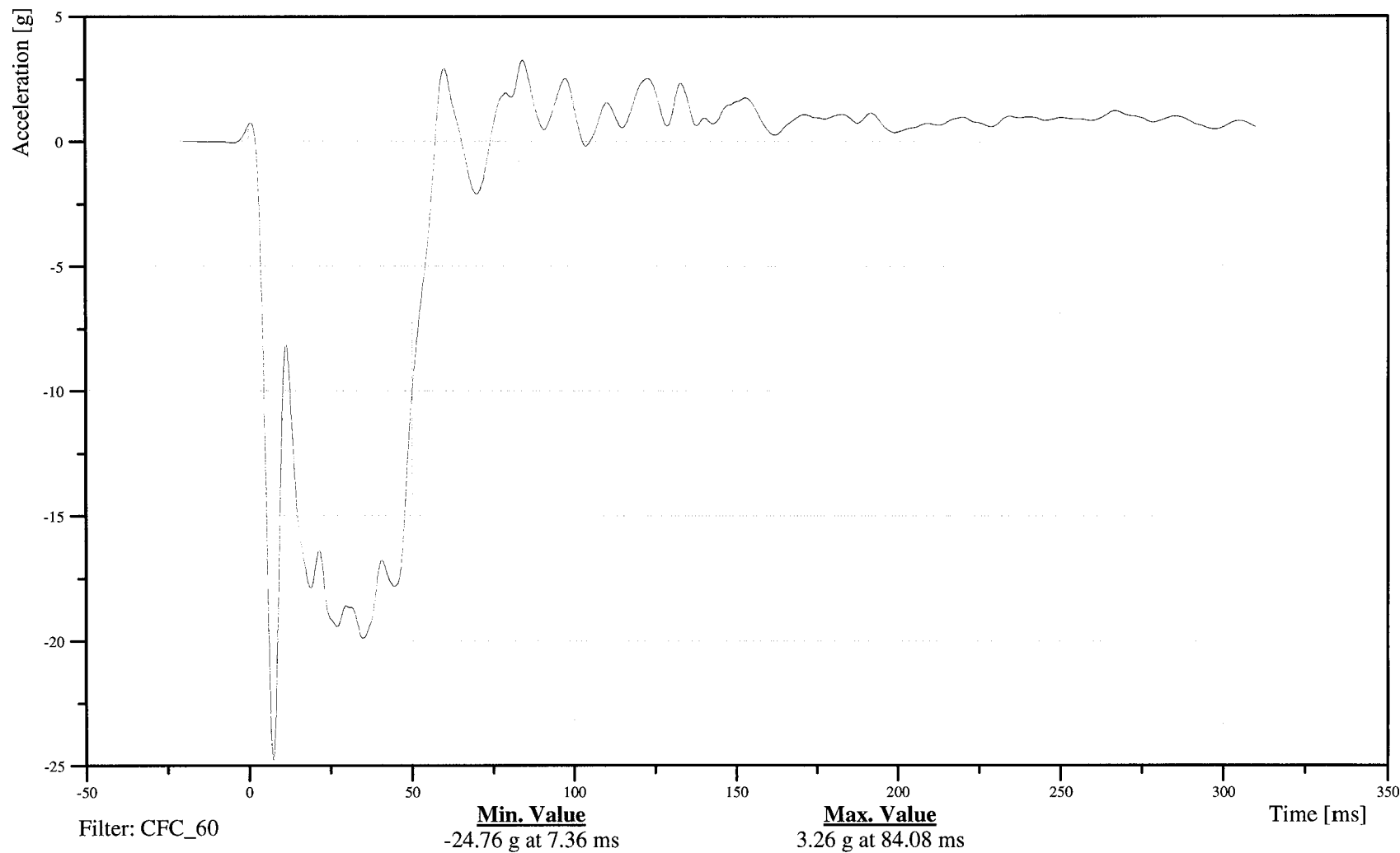
Customer: NHTSA

Test Number: C70509

14SILBRE0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-48

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT SIDE SILL AT REAR SEAT Y-AXIS VELOCITY

Time: 12:32

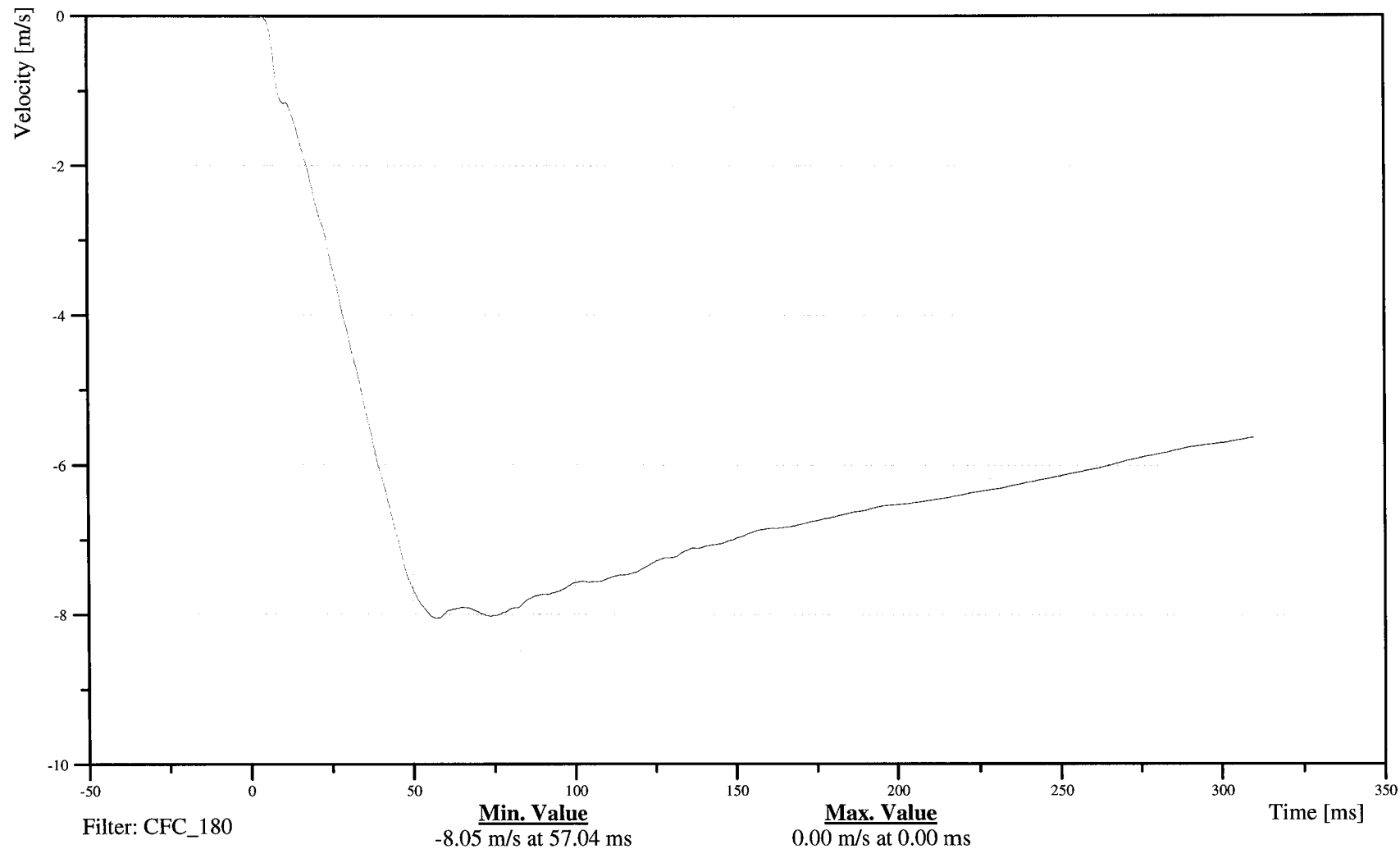
Customer: NHTSA

Test Number: C70509

14SILBRE0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-49

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT SIDE SILL AT REAR SEAT Z-AXIS ACCELERATION

Time: 12:32

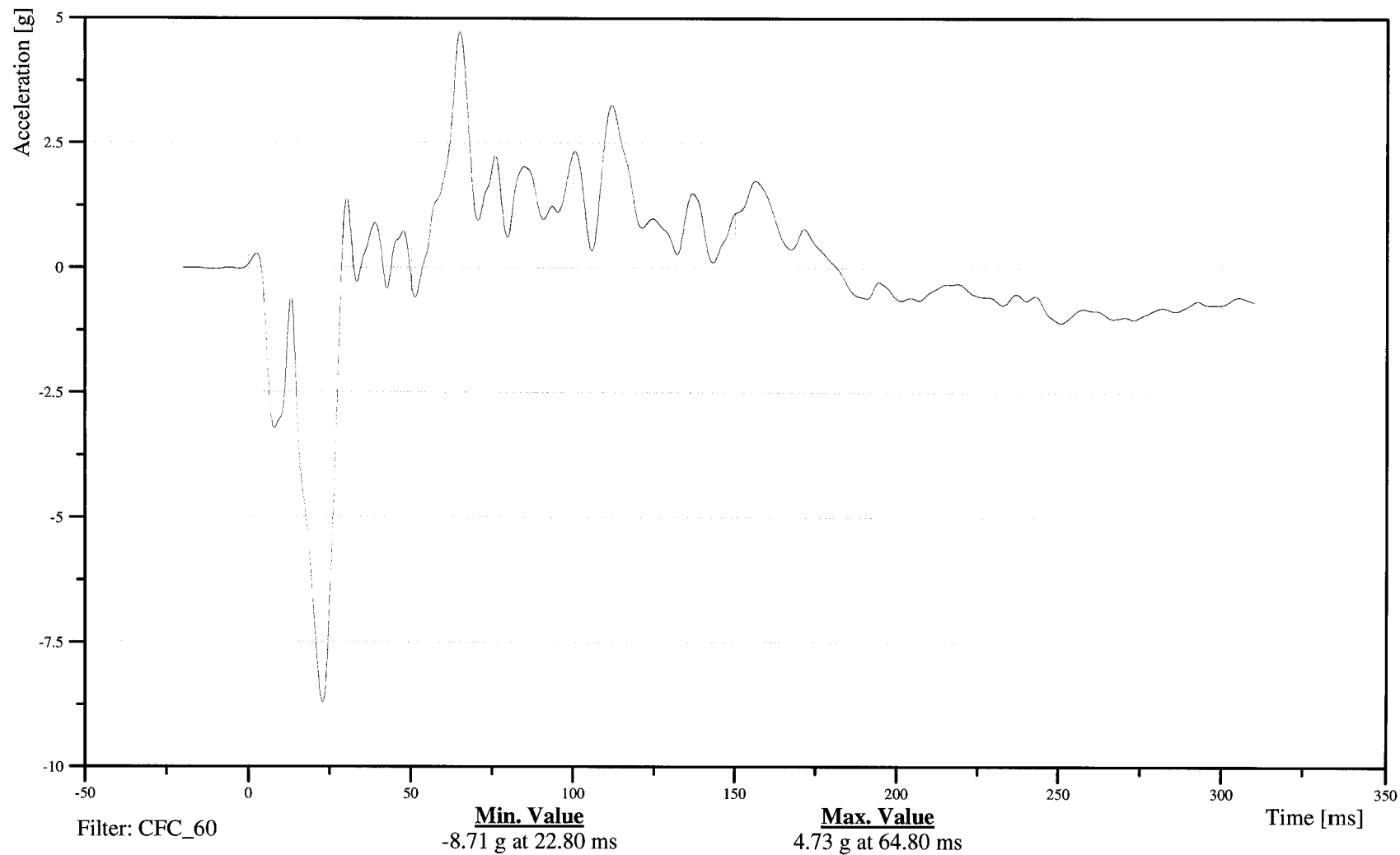
Customer: NHTSA

Test Number: C70509

14SILBRE0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-50

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

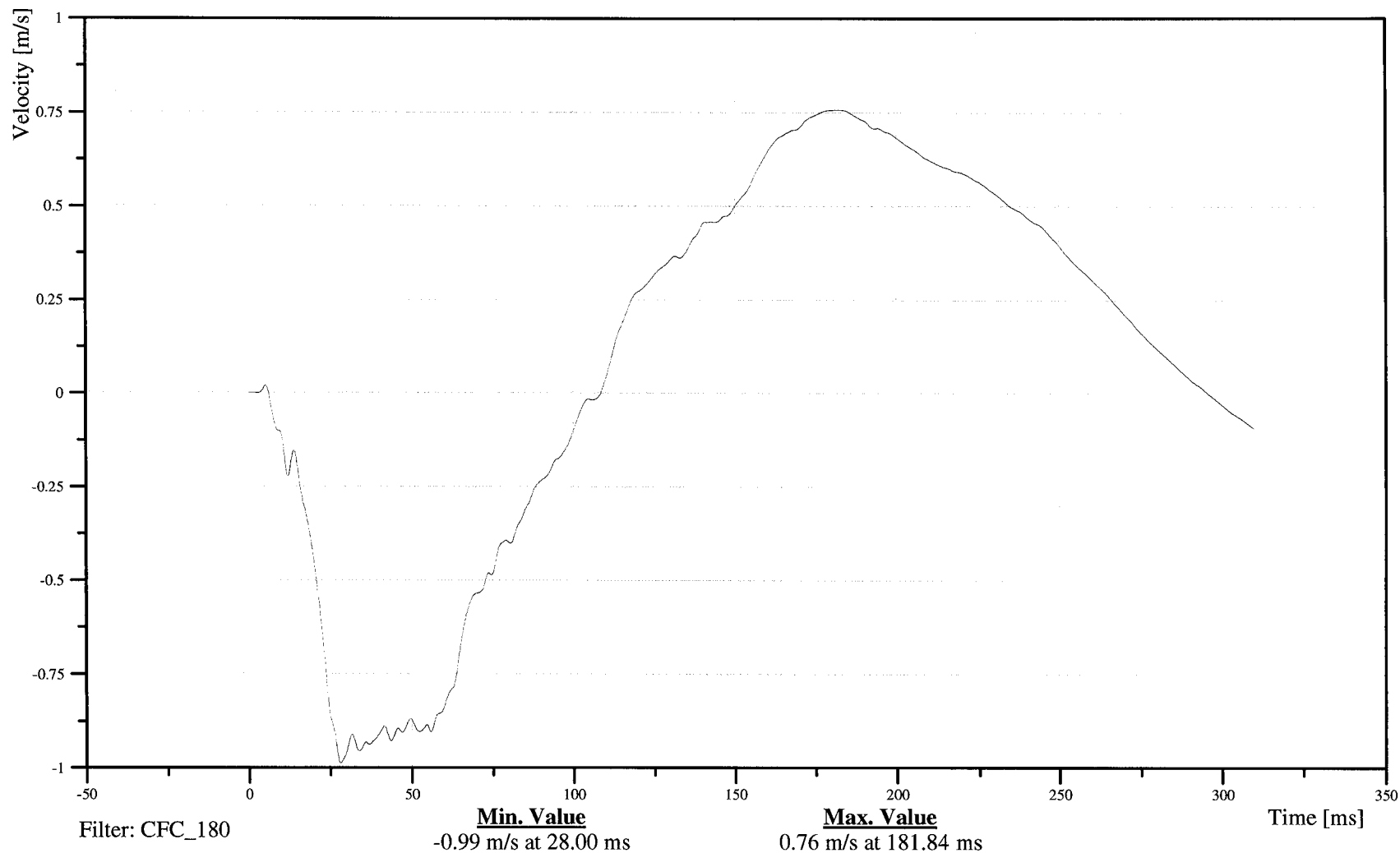
LEFT SIDE SILL AT REAR SEAT Z-AXIS VELOCITY

Time: 12:32

Customer: NHTSA  
Test Number: C70509

14SILBRE0000VEZC

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-51

070323





48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION

Time: 12:32

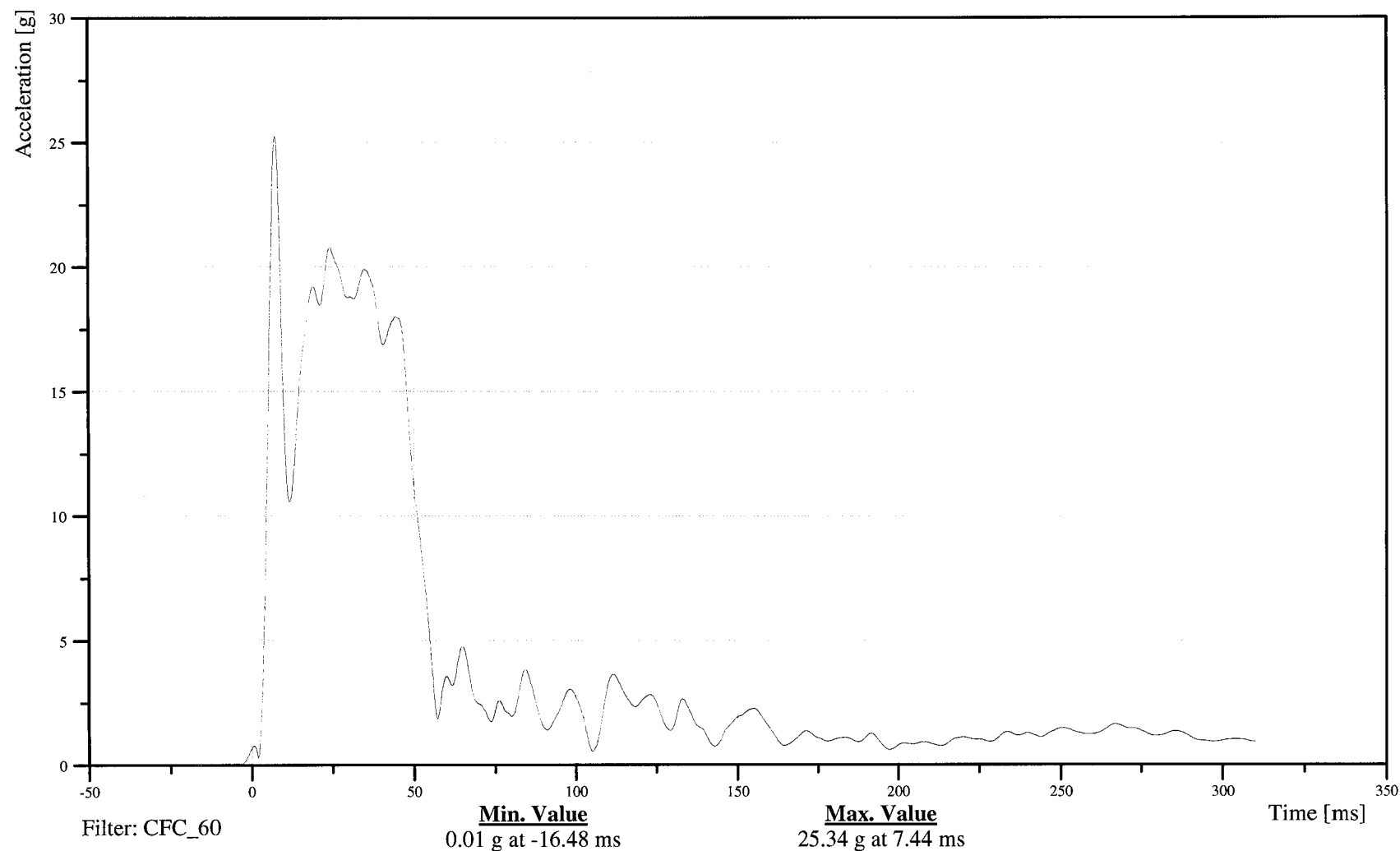
Customer: NHTSA

Test Number: C70509

14SILBRE0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-52

070323



# 48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

## REAR FLOORPAN ABOVE AXLE X-AXIS ACCELERATION

Time: 12:32

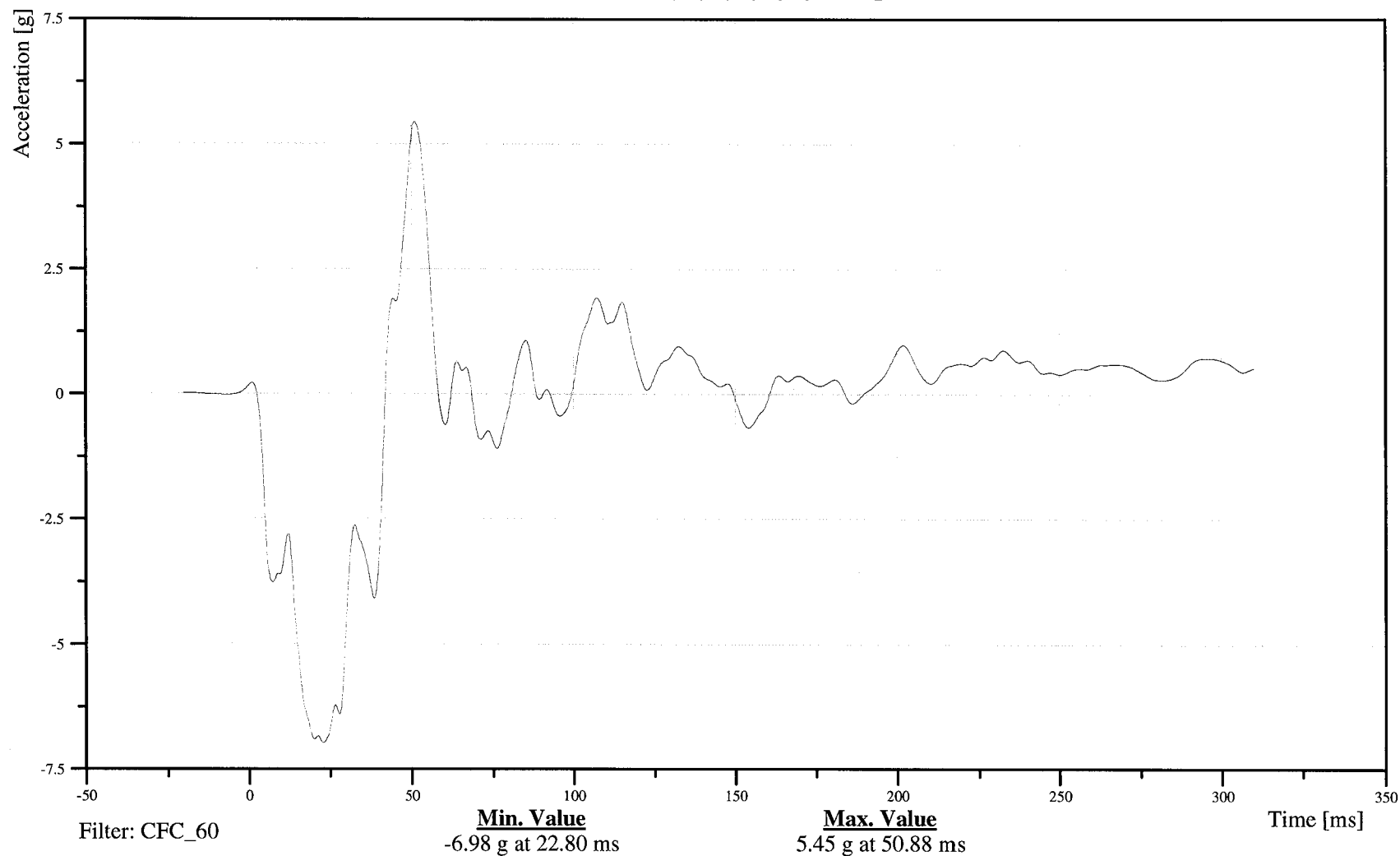
Customer: NHTSA

Test Number: C70509

### 18FORA000000ACXD

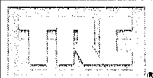
TRC Inc. Test Lab: CTF

Test Number: 070323



B-53

070323



# 48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

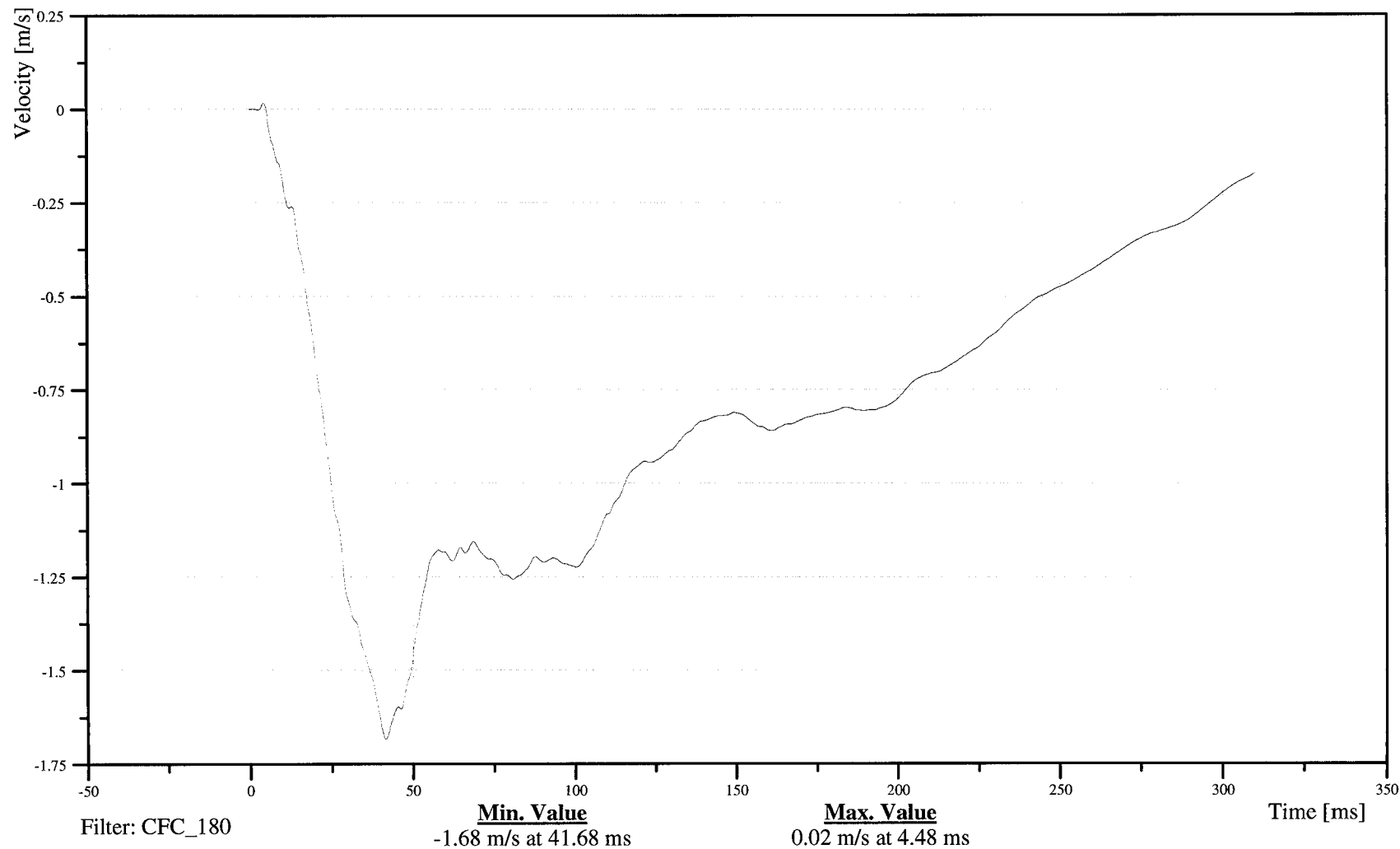
Date: 03/23/2007  
Time: 12:32

## REAR FLOORPAN ABOVE AXLE X-AXIS VELOCITY

Customer: NHTSA  
Test Number: C70509

### 18FORA000000VEXC

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-54

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

Time: 12:32

REAR FLOORPAN ABOVE AXLE Y-AXIS ACCELERATION

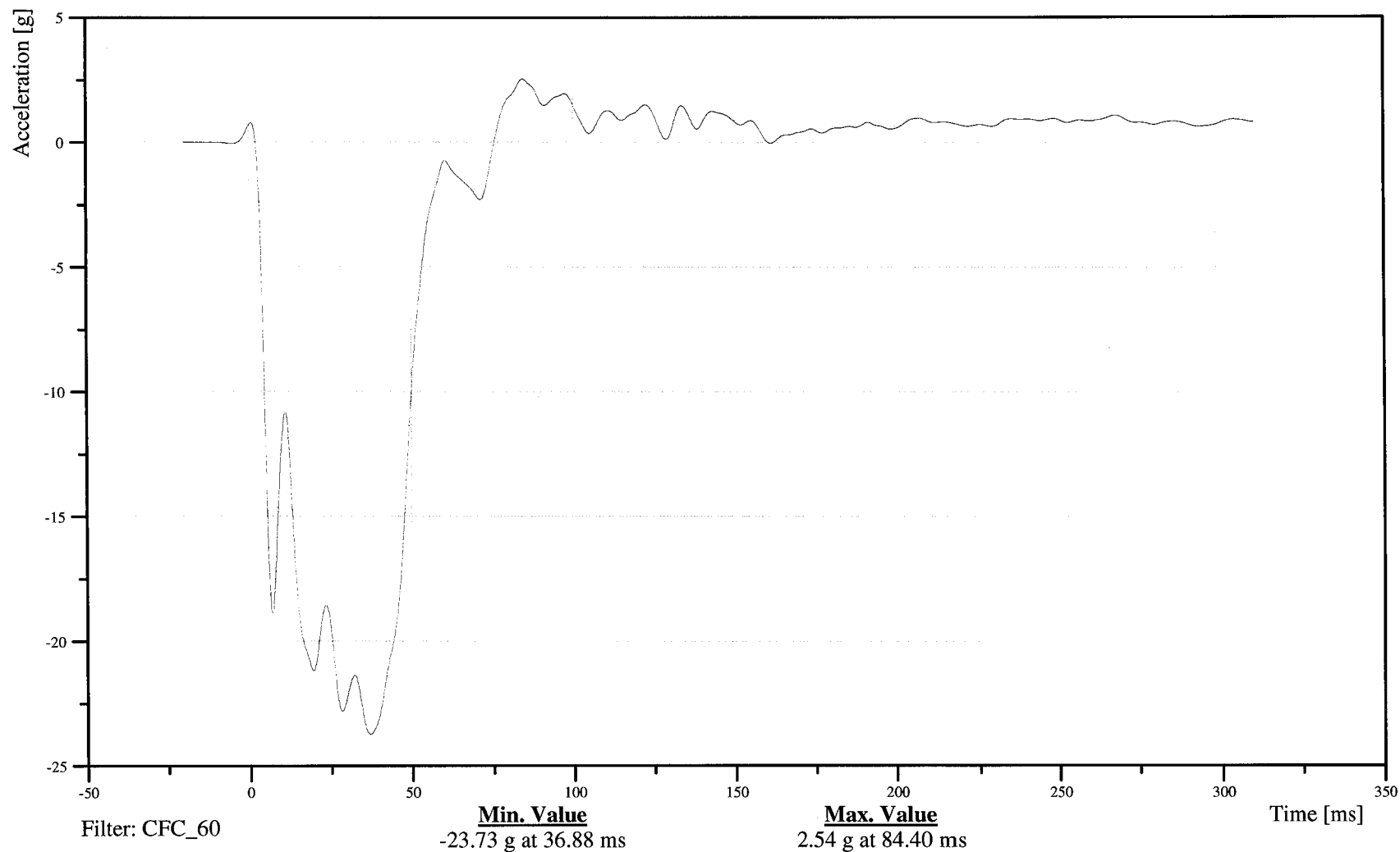
Customer: NHTSA

Test Number: C70509

18FORA000000ACYD

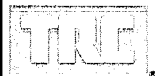
TRC Inc. Test Lab: CTF

Test Number: 070323



B-55

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

REAR FLOORPAN ABOVE AXLE Y-AXIS VELOCITY

Time: 12:32

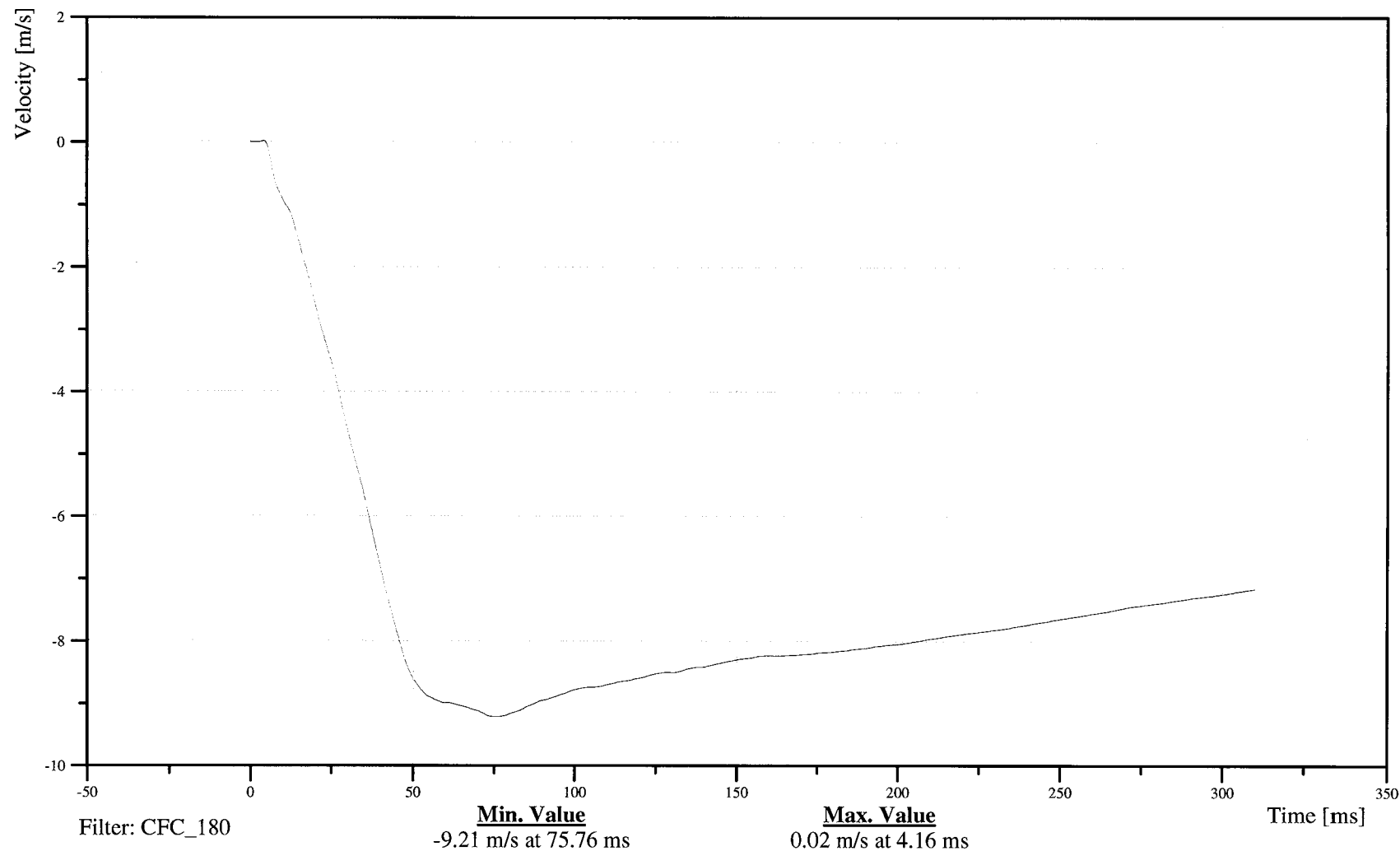
Customer: NHTSA

Test Number: C70509

18FORA000000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-56

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

REAR FLOORPAN ABOVE AXLE Z-AXIS ACCELERATION

Time: 12:32

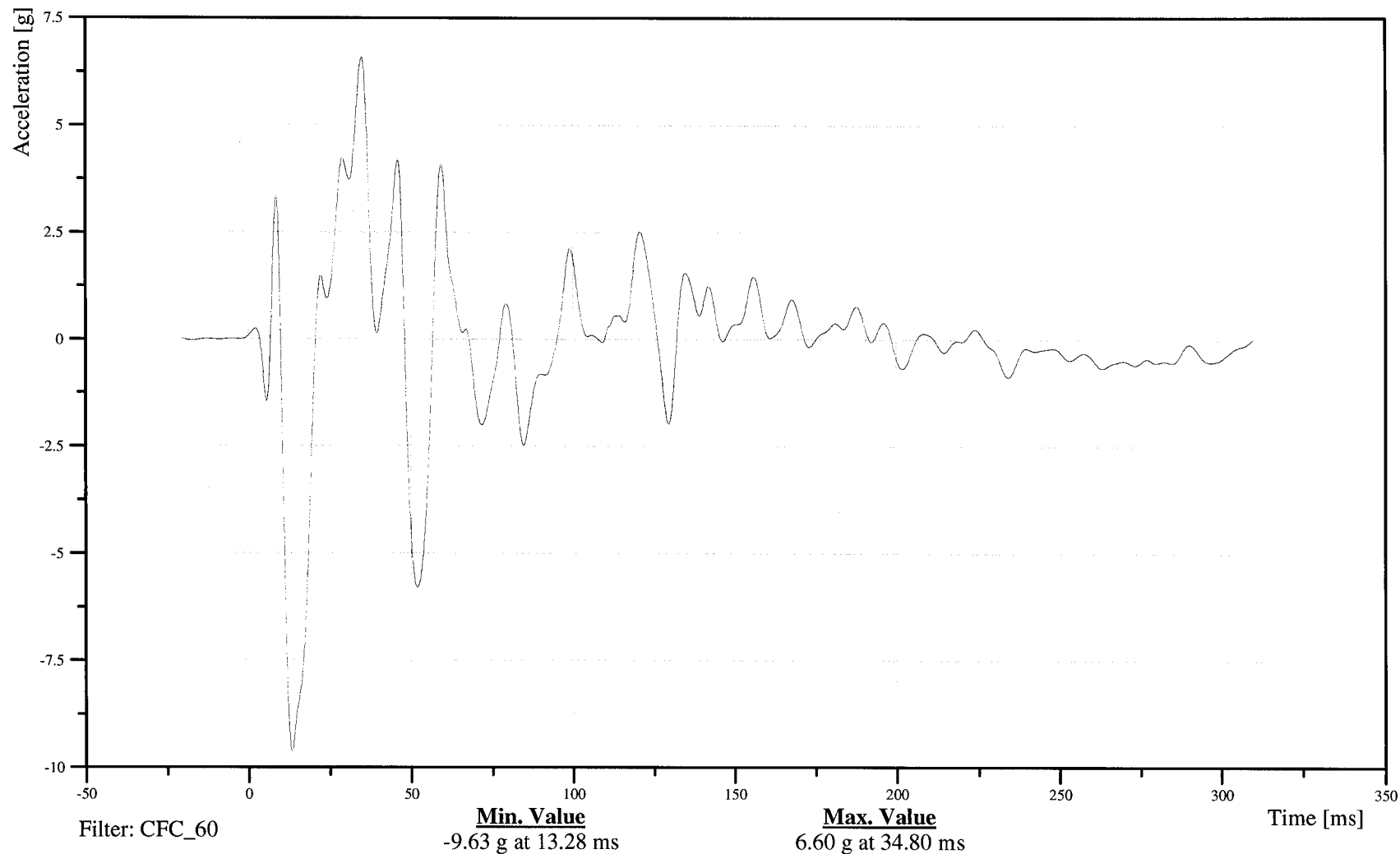
Customer: NHTSA

Test Number: C70509

18FORA000000ACZD

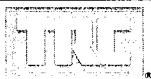
TRC Inc. Test Lab: CTF

Test Number: 070323



B-57

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

REAR FLOORPAN ABOVE AXLE Z-AXIS VELOCITY

Time: 12:32

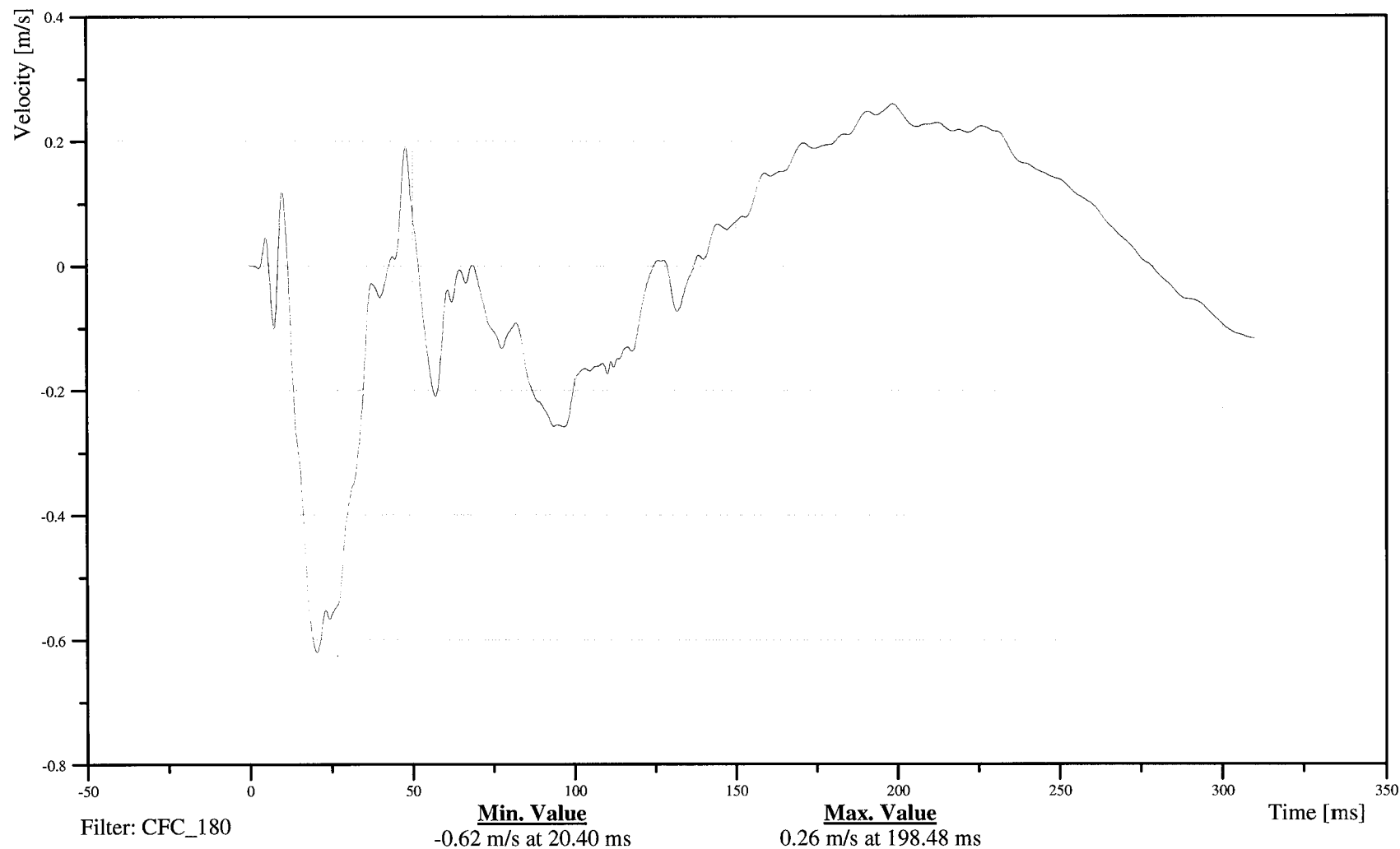
Customer: NHTSA

Test Number: C70509

18FORA000000VEZC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-58

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION

Time: 12:32

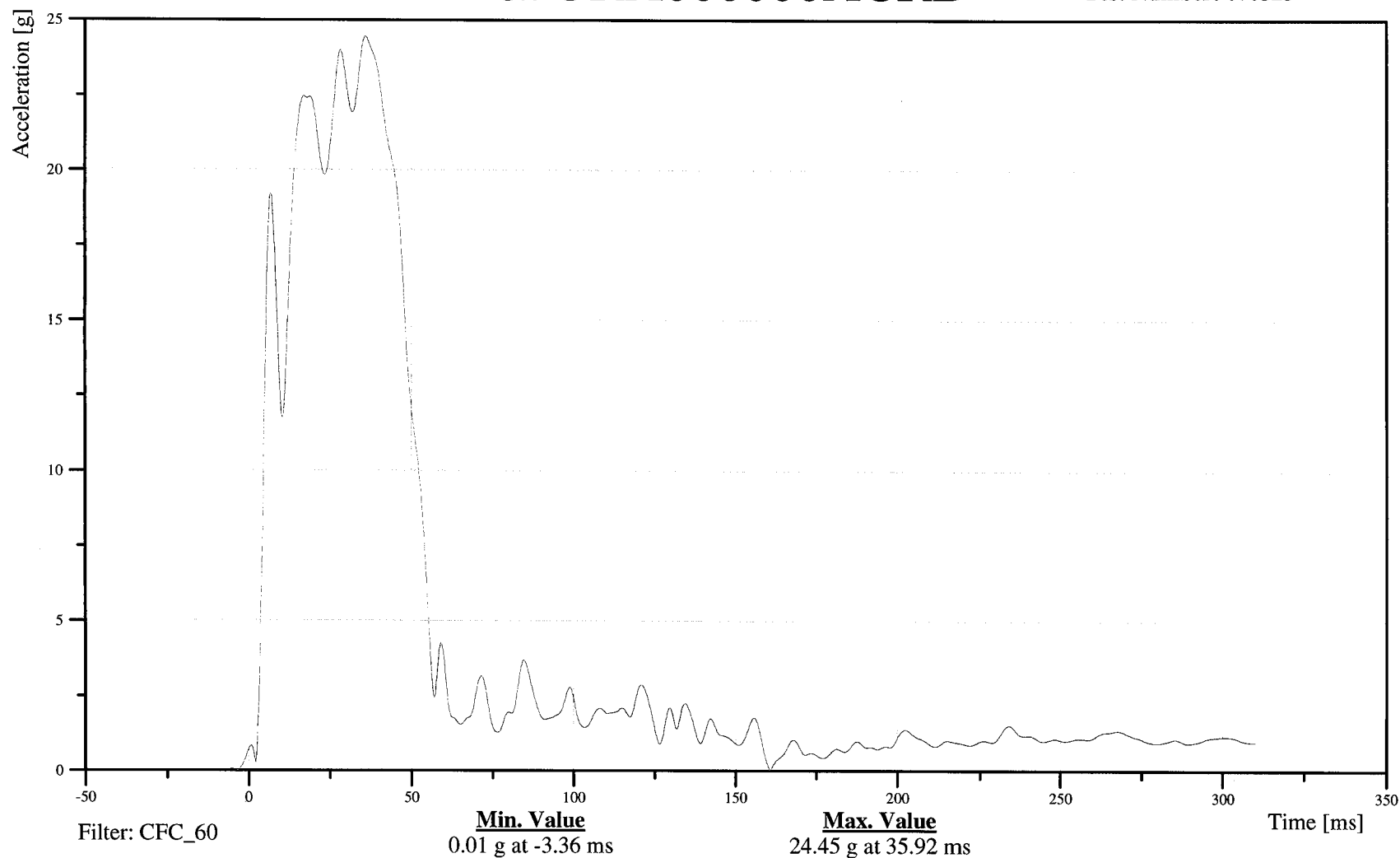
Customer: NHTSA

Test Number: C70509

18FORA000000ACRD

TRC Inc. Test Lab: CTF

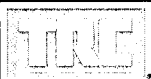
Test Number: 070323



B-59

070323





48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT SIDE SILL AT FRONT SEAT Y-AXIS ACCELERATION

Time: 12:32

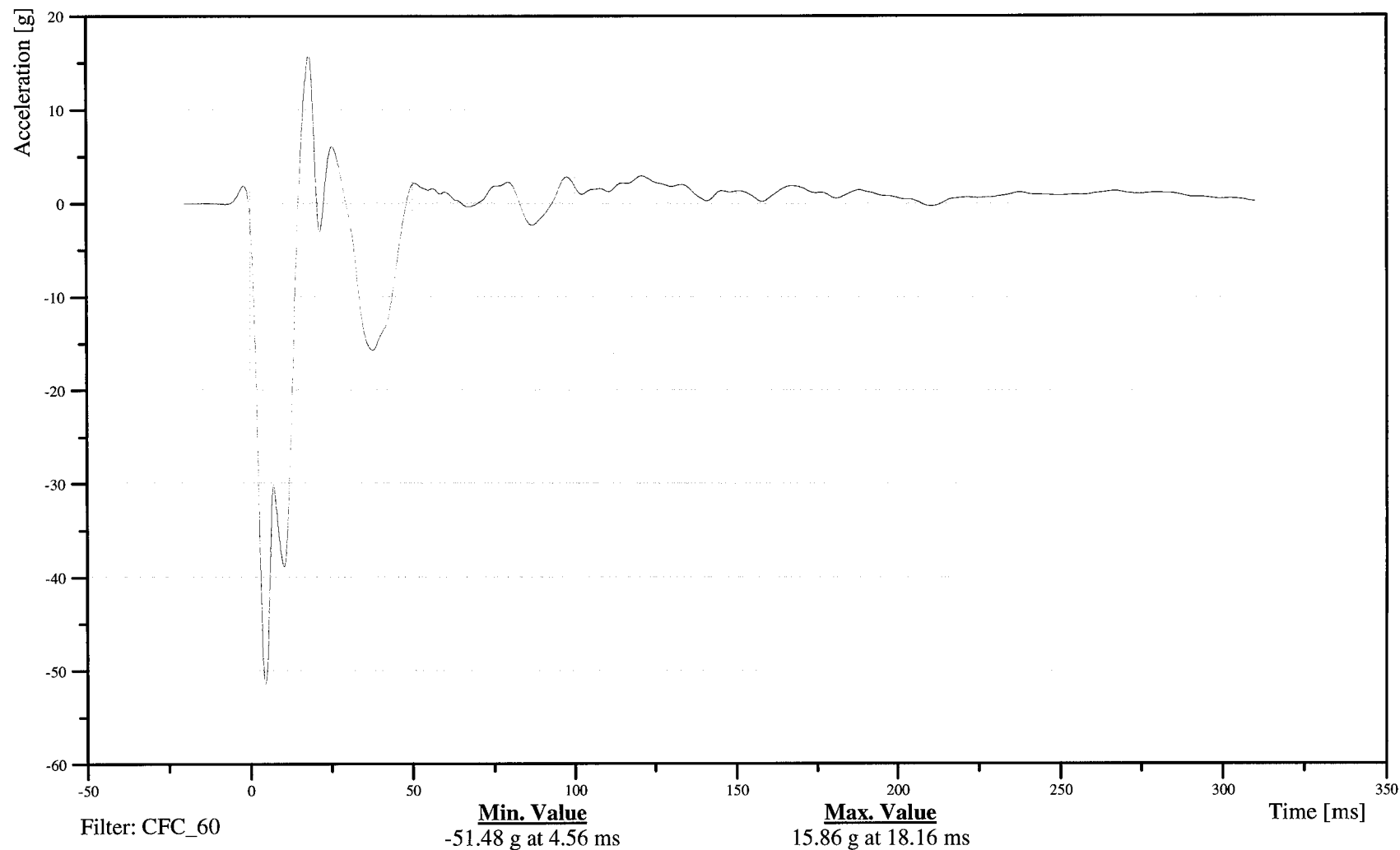
Customer: NHTSA

Test Number: C70509

16SILBFR0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-60

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT SIDE SILL AT FRONT SEAT Y-AXIS VELOCITY

Time: 12:32

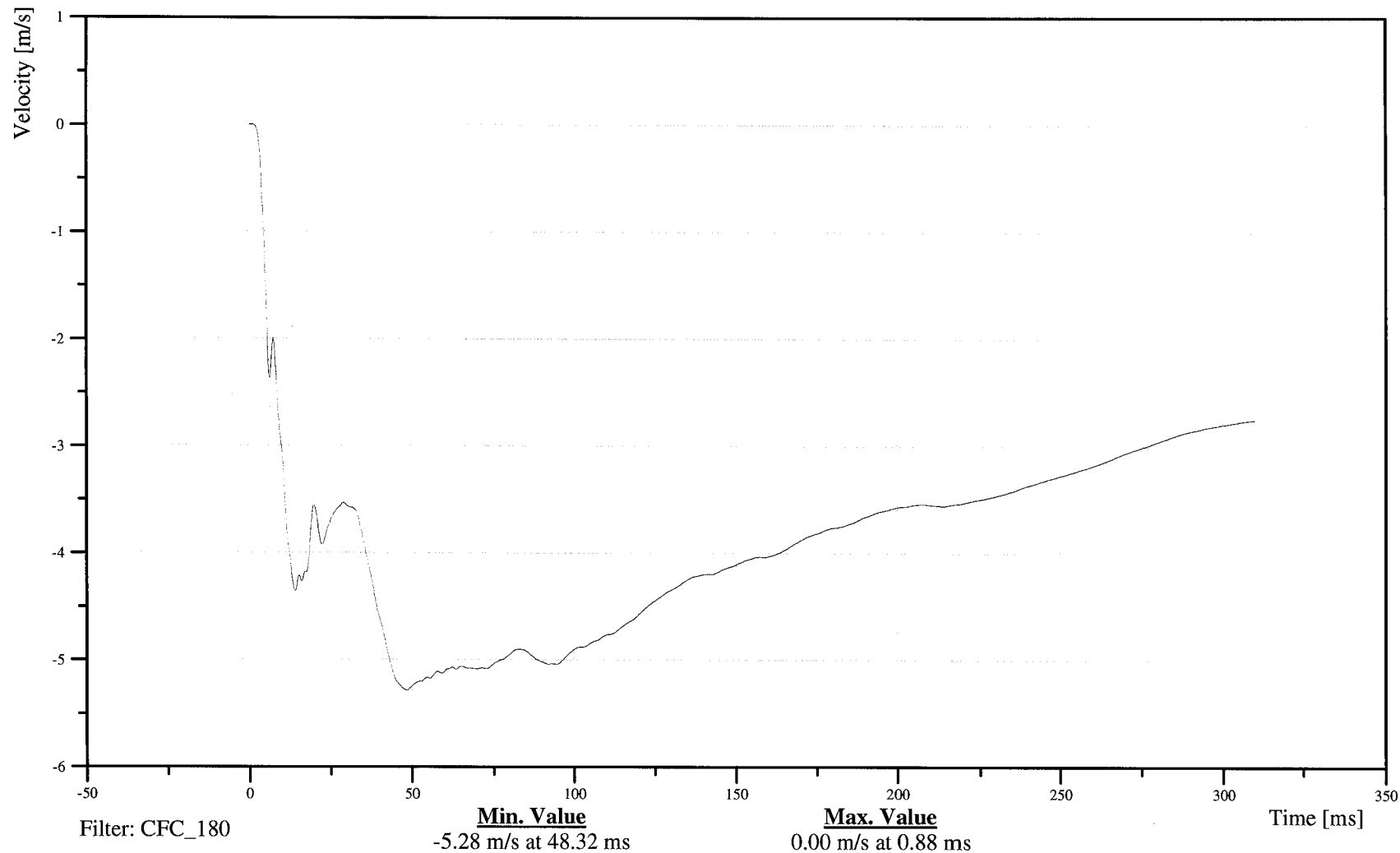
Customer: NHTSA

Test Number: C70509

16SILBFR0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-61

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

Time: 12:32

RIGHT SIDE SILL AT FRONT SEAT Y-AXIS DISPLACEMENT

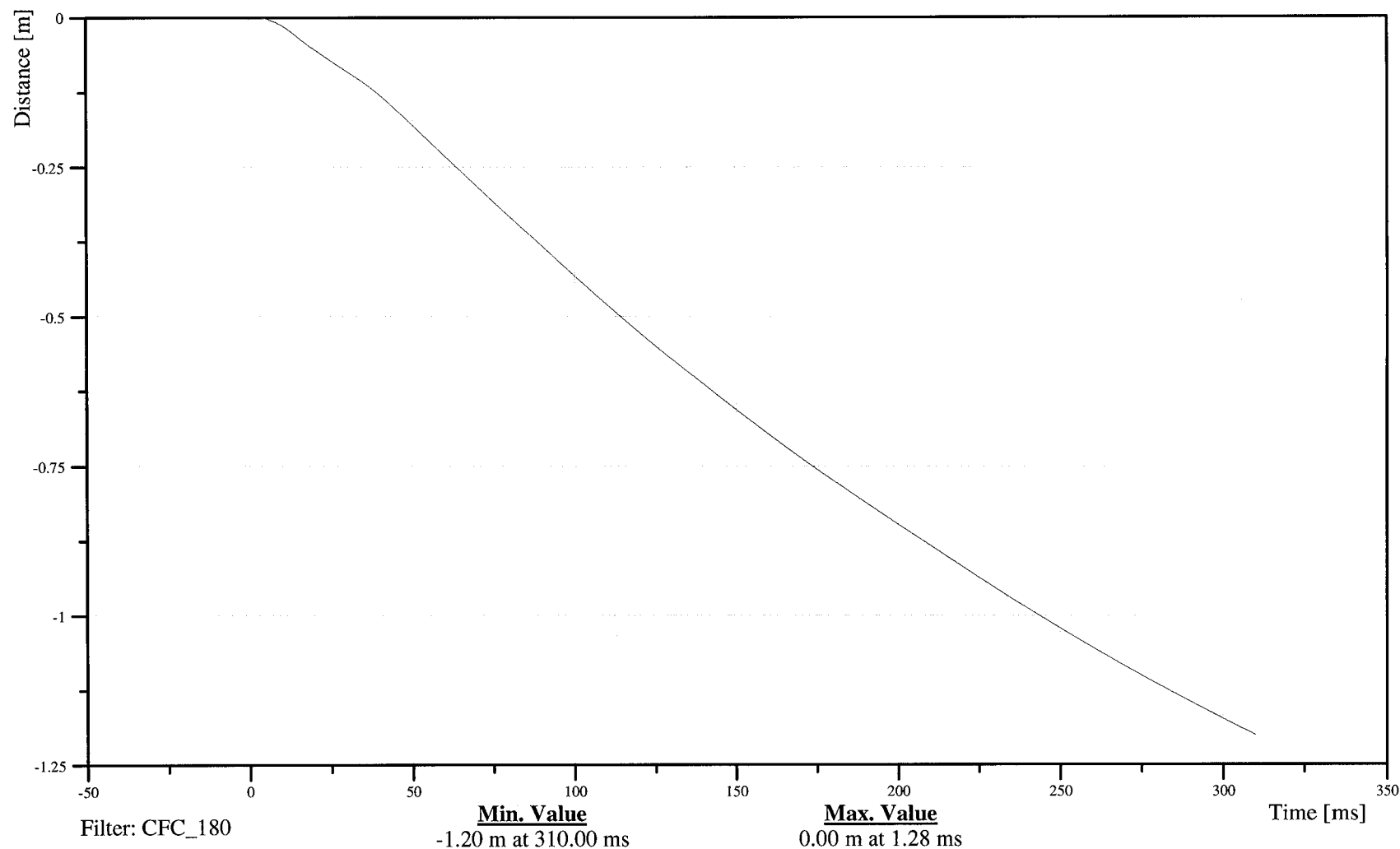
Customer: NHTSA

Test Number: C70509

16SILBFR0000DCYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-62

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT SIDE SILL AT REAR SEAT Y-AXIS ACCELERATION

Time: 12:32

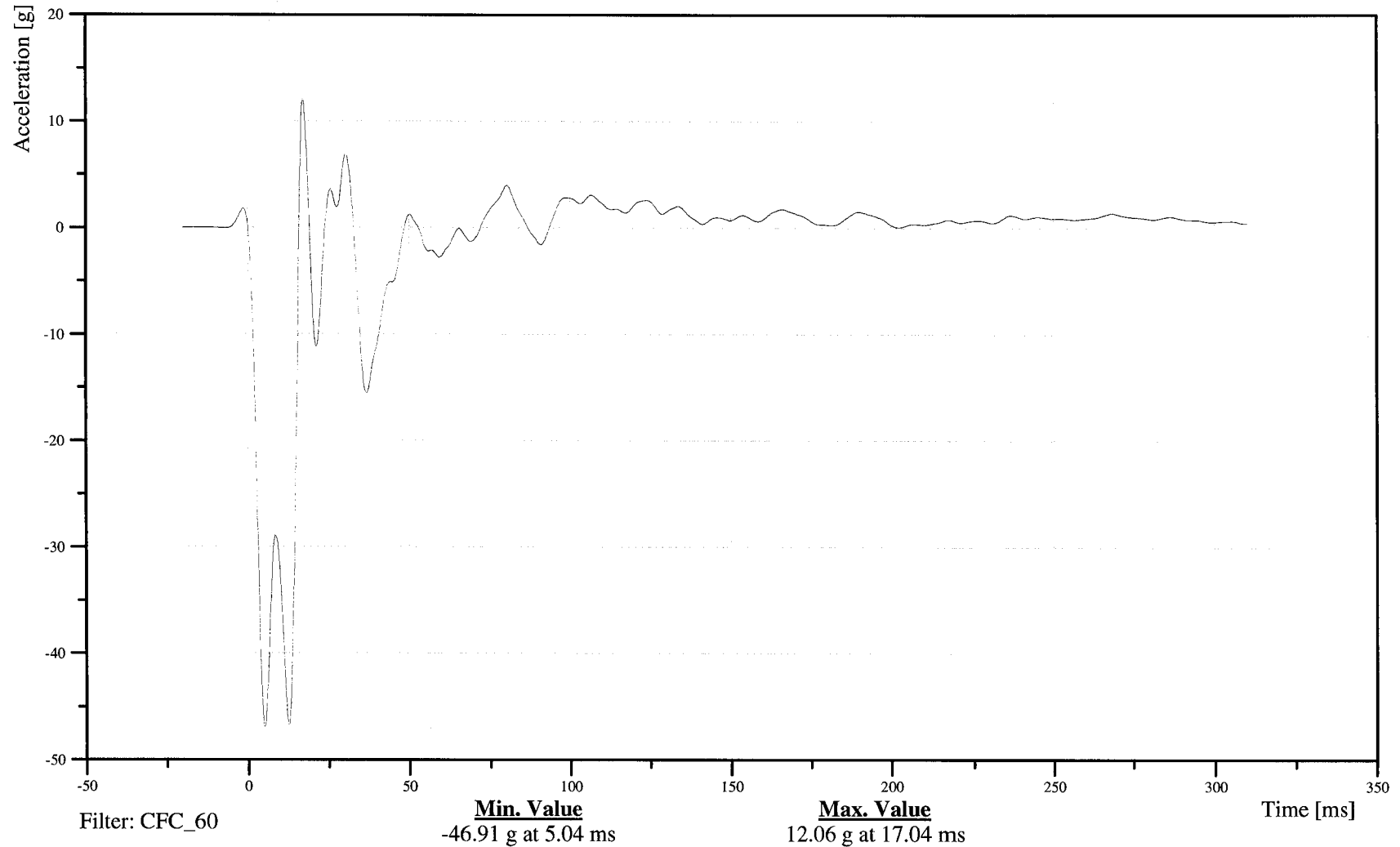
Customer: NHTSA

Test Number: C70509

16SILBRE0000ACYD

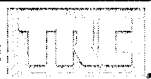
TRC Inc. Test Lab: CTF

Test Number: 070323



B-63

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT SIDE SILL AT REAR SEAT Y-AXIS VELOCITY

Time: 12:32

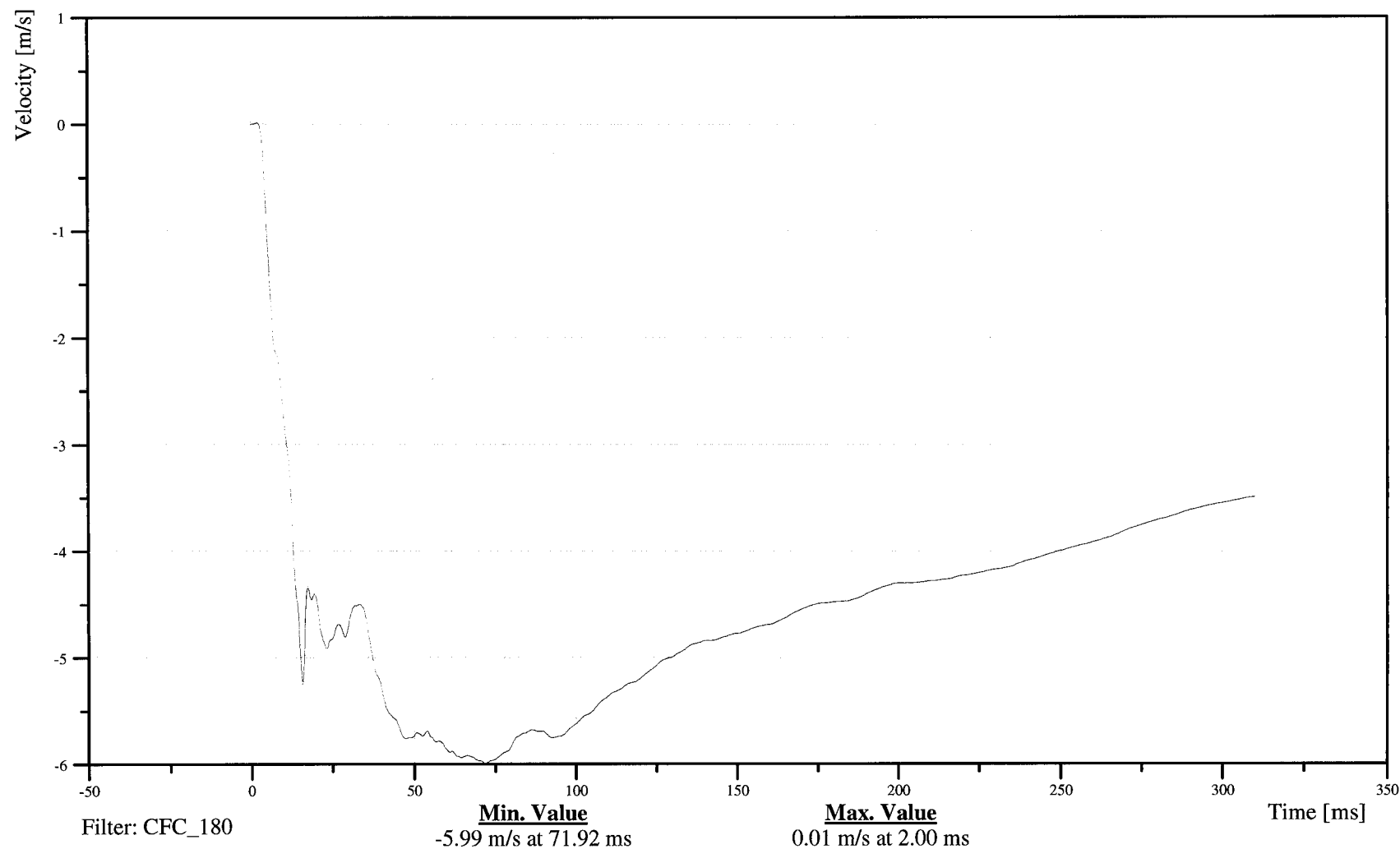
Customer: NHTSA

Test Number: C70509

16SILBRE0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-64

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

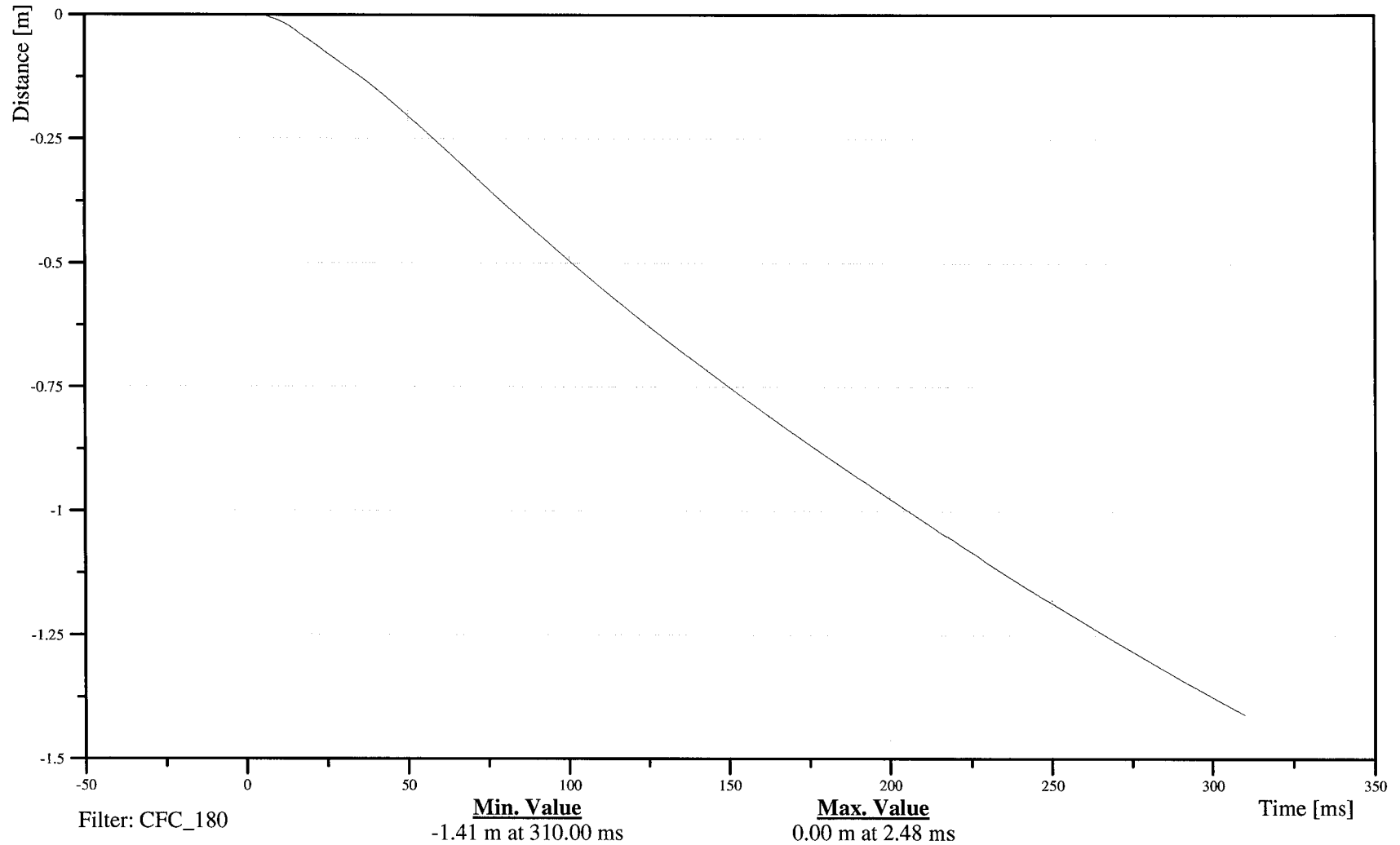
RIGHT SIDE SILL AT REAR SEAT Y-AXIS DISPLACEMENT

Time: 12:32

Customer: NHTSA  
Test Number: C70509

16SILBRE0000DCYC

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-65

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT REAR OCCUPANT COMPARTMENT Y-AXIS ACCELERATION

Time: 12:32

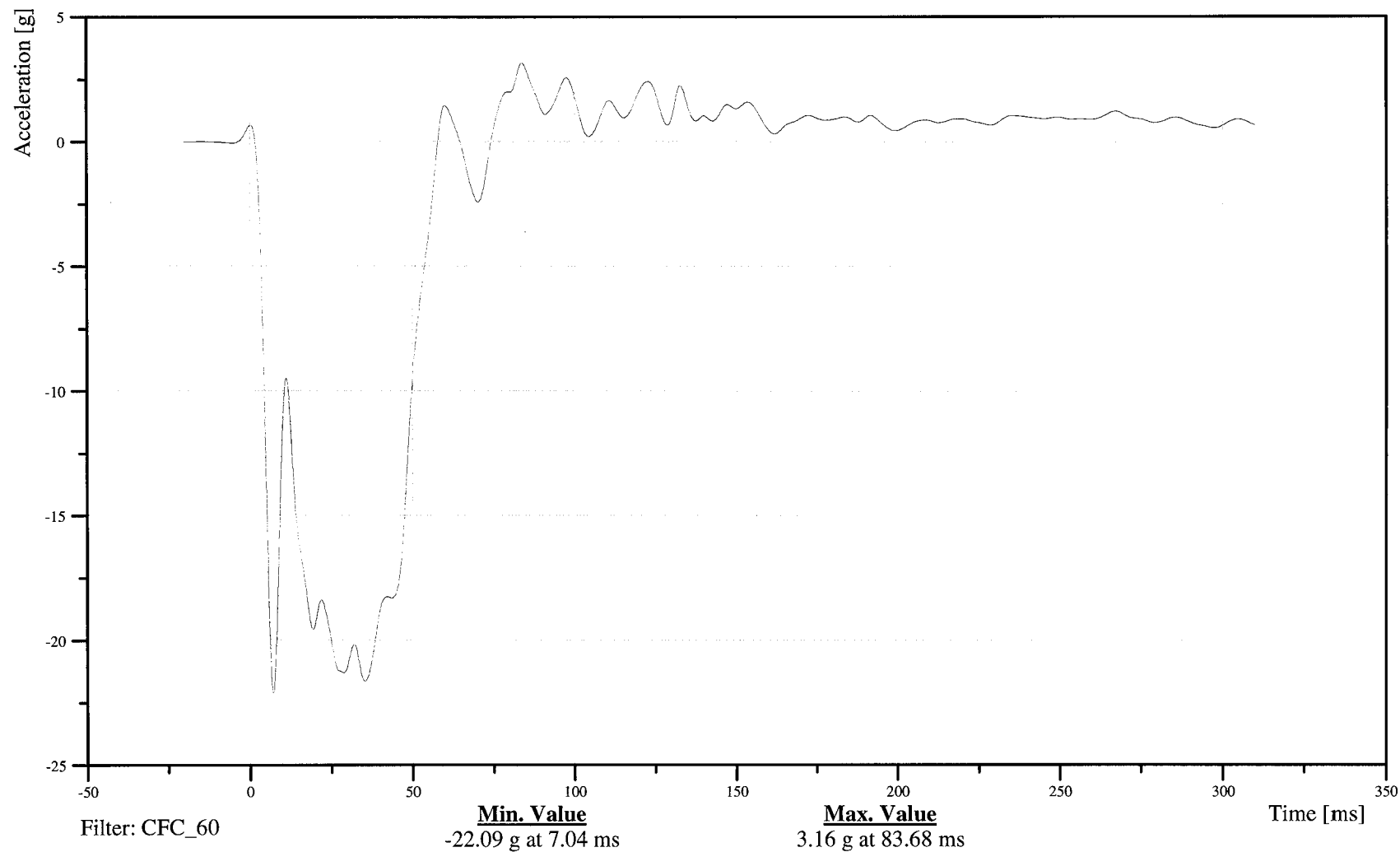
Customer: NHTSA

Test Number: C70509

14VEHCRE0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-66

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

LEFT REAR OCCUPANT COMPARTMENT Y-AXIS VELOCITY

Time: 12:32

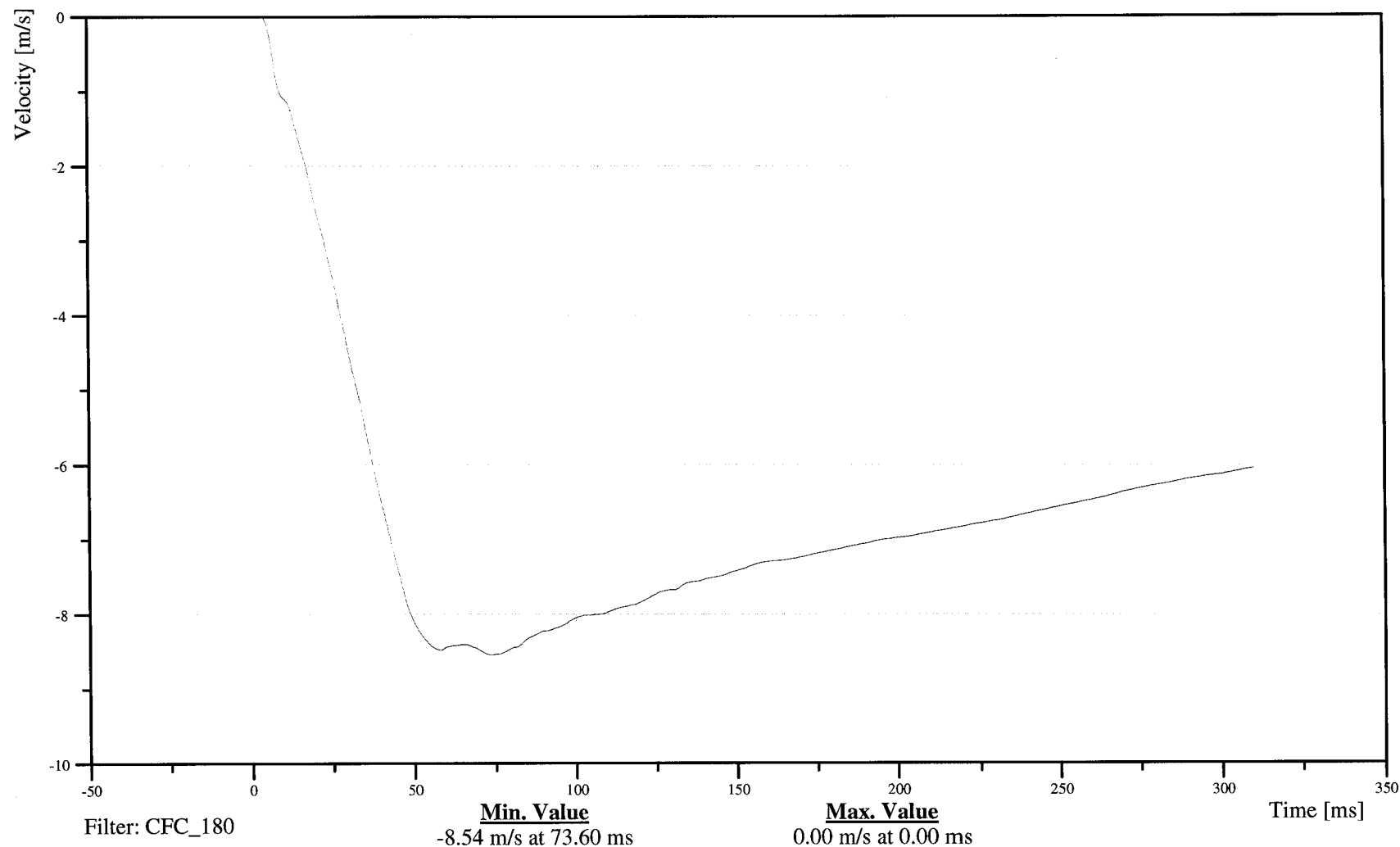
Customer: NHTSA

Test Number: C70509

14VEHCRE0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-67

070323





# 48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

## LEFT REAR OCCUPANT COMPARTMENT Y-AXIS DISPLACEMENT

Time: 12:32

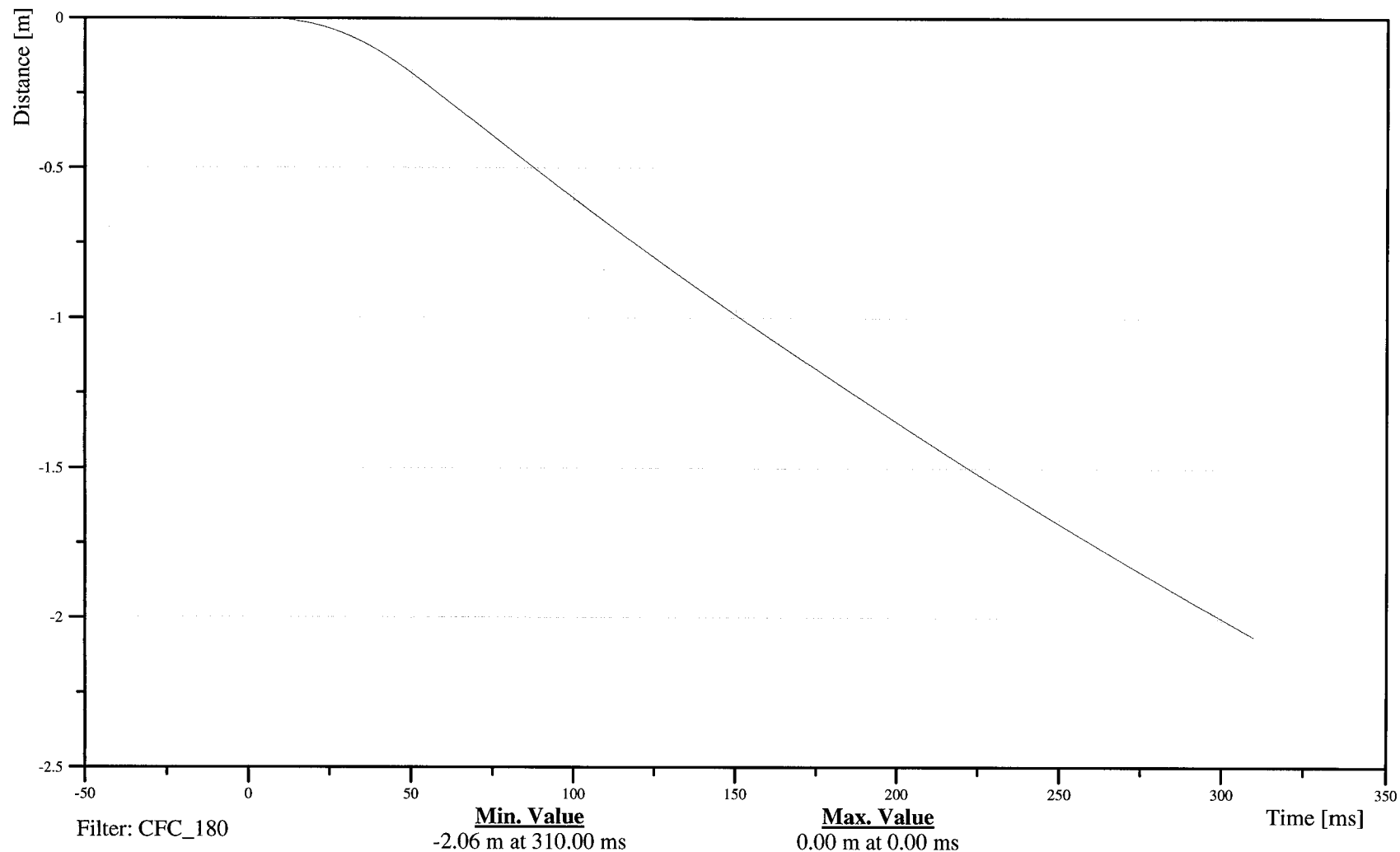
Customer: NHTSA

Test Number: C70509

### 14VEHCRE0000DCYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-68

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT LOWER A-POST Y-AXIS ACCELERATION

Time: 12:32

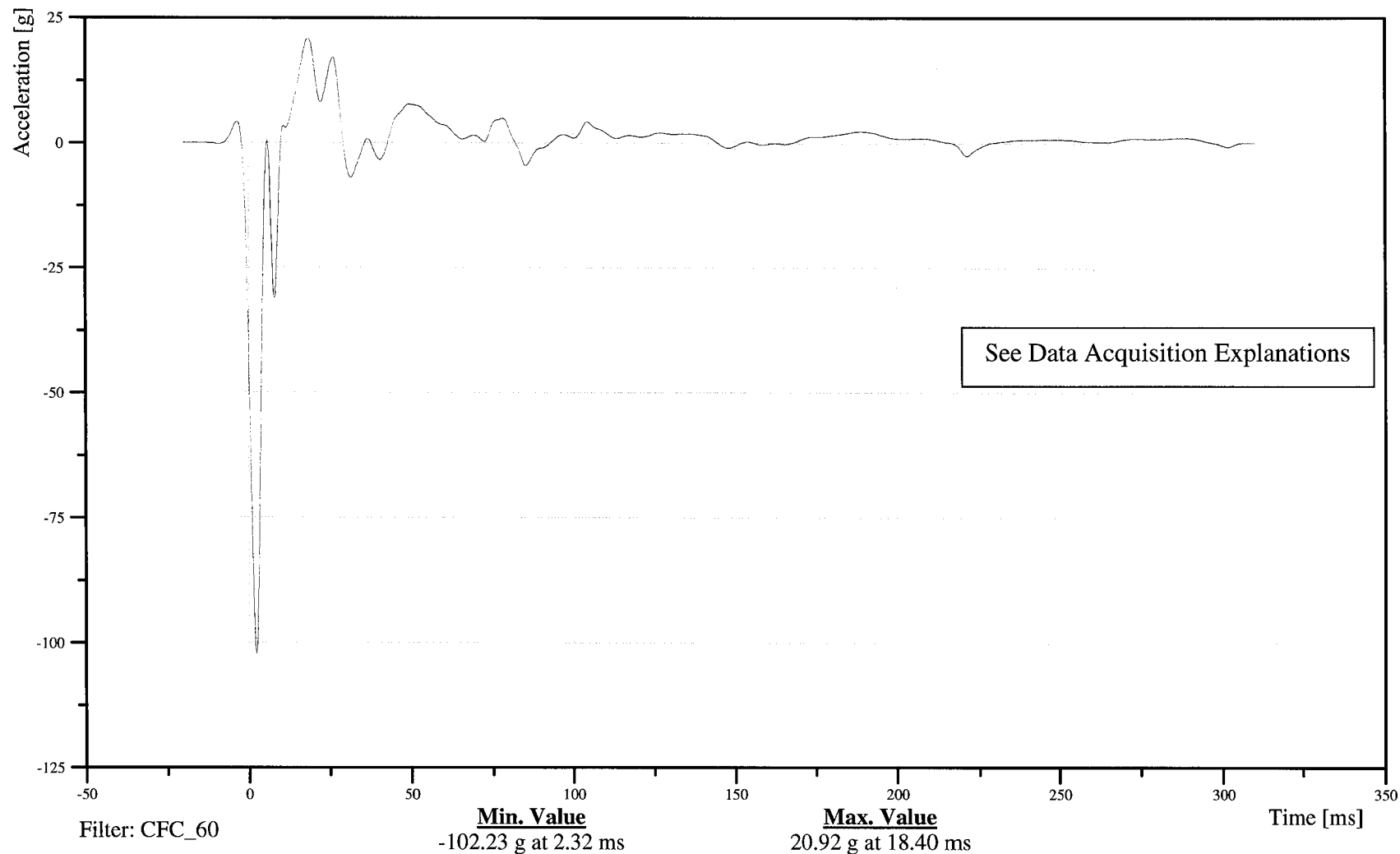
Customer: NHTSA

Test Number: C70509

13APILLO0000ACYD

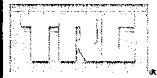
TRC Inc. Test Lab: CTF

Test Number: 070323



B-69

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT LOWER A-POST Y-AXIS VELOCITY

Time: 12:32

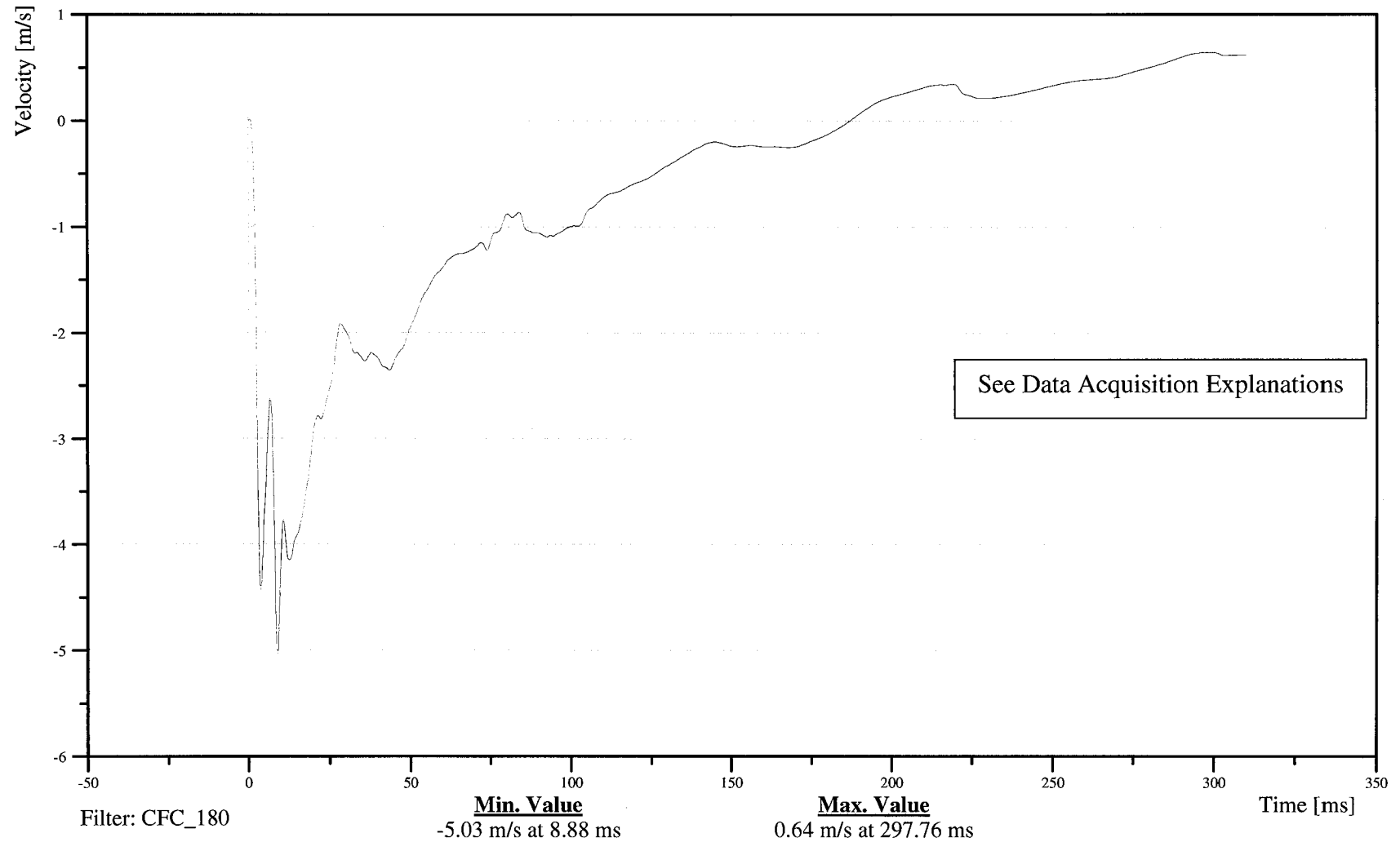
Customer: NHTSA

Test Number: C70509

13APILO0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-70

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT MIDDLE A-POST Y-AXIS ACCELERATION

Time: 12:32

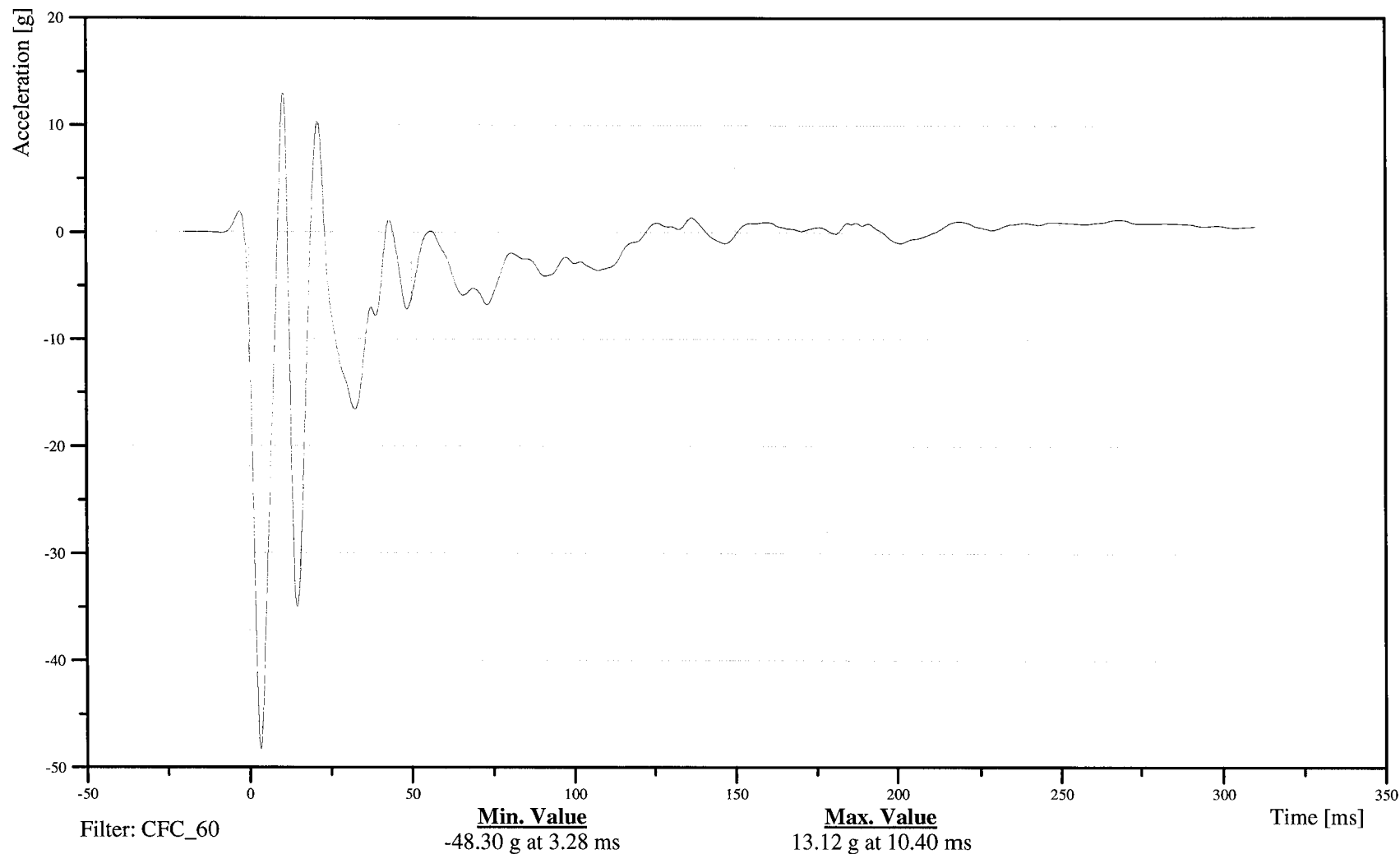
Customer: NHTSA

Test Number: C70509

13APILMI0000ACYD

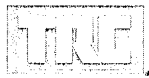
TRC Inc. Test Lab: CTF

Test Number: 070323



B-71

070323



# 48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

## RIGHT MIDDLE A-POST Y-AXIS VELOCITY

Time: 12:32

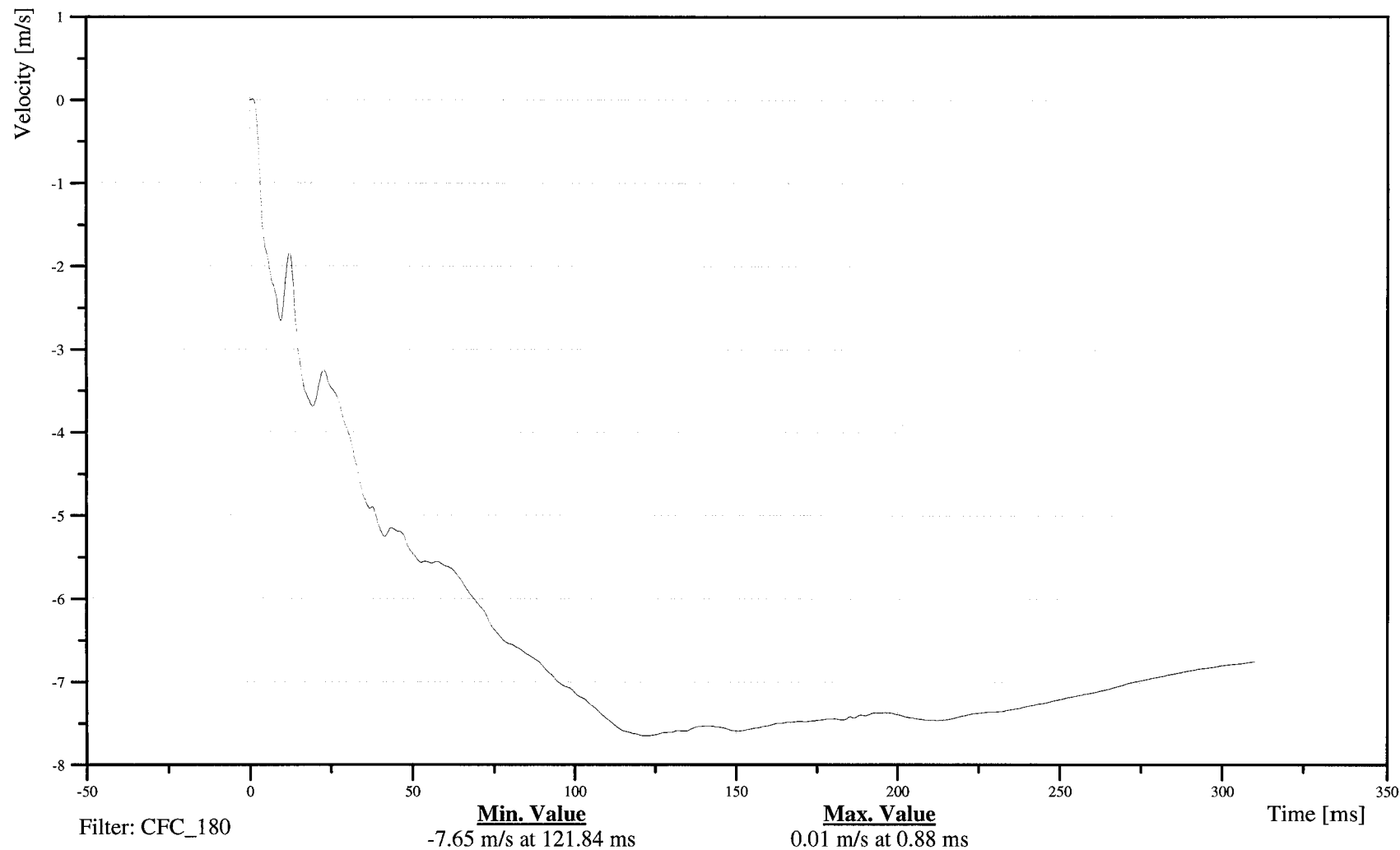
Customer: NHTSA

Test Number: C70509

# 13APILMI0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-72

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT LOWER B-POST Y-AXIS ACCELERATION

Time: 12:32

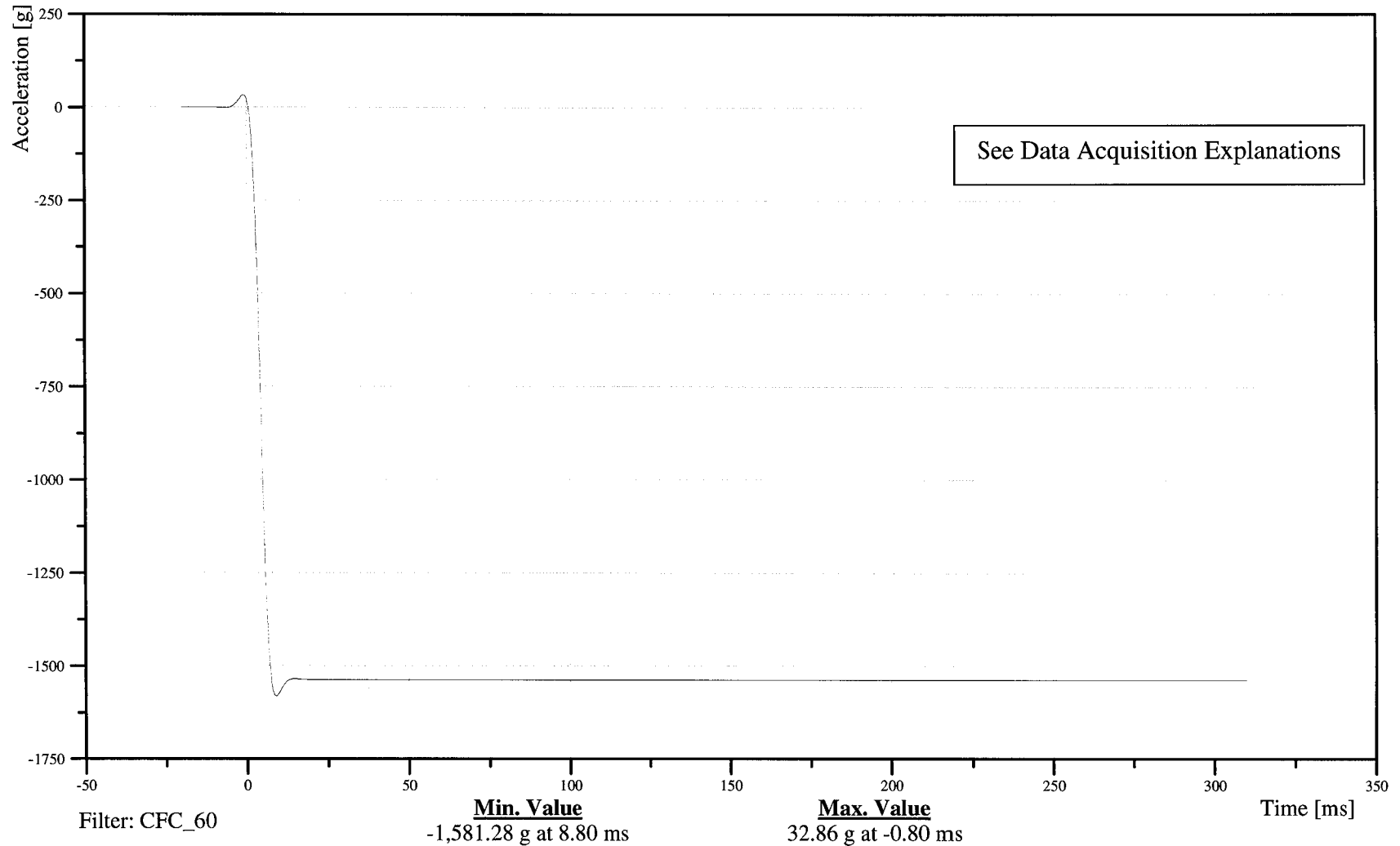
Customer: NHTSA

Test Number: C70509

16BPILLO0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-73

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT LOWER B-POST Y-AXIS VELOCITY

Time: 12:32

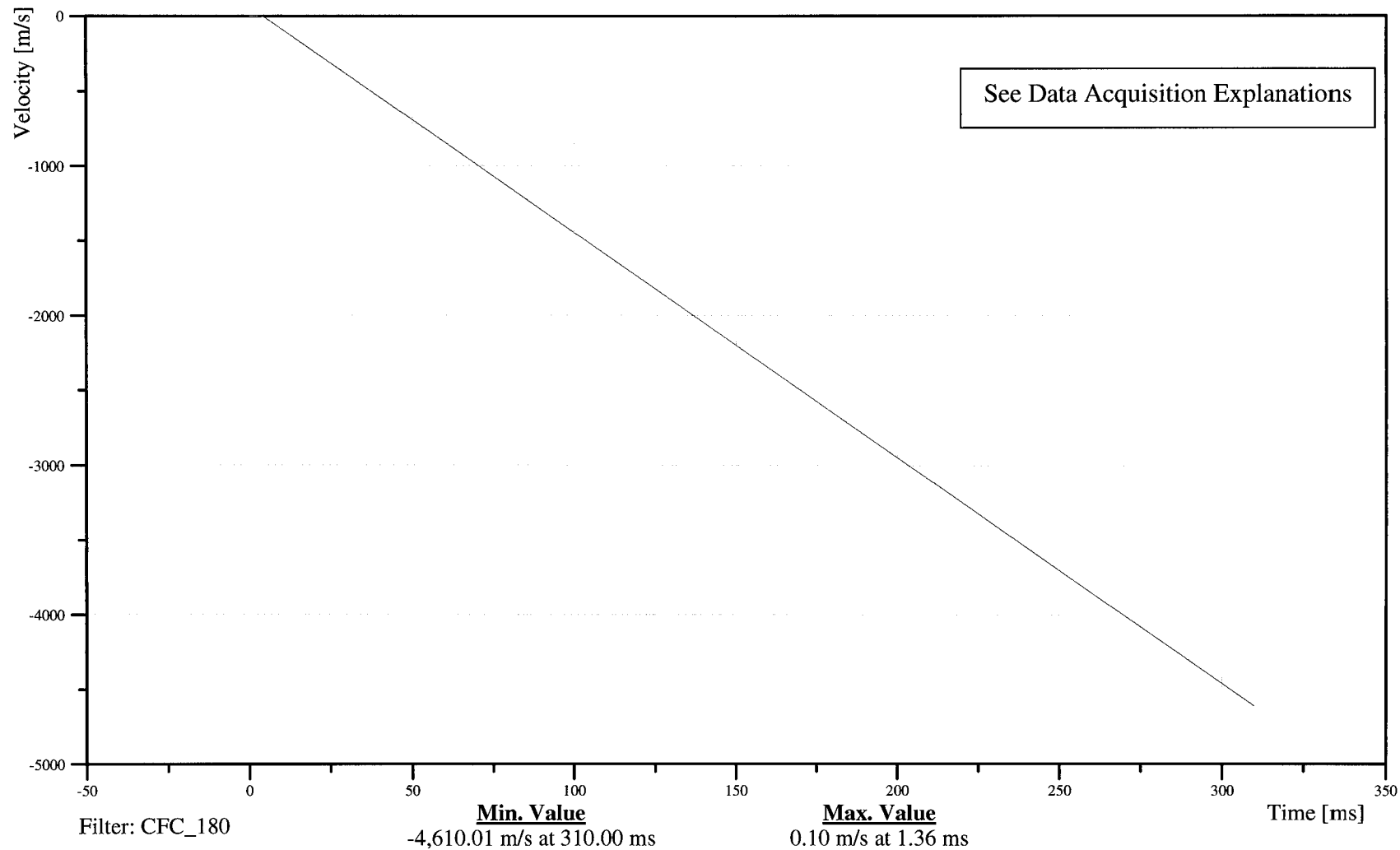
Customer: NHTSA

Test Number: C70509

16BPILLO0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-74

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT MIDDLE B-POST Y-AXIS ACCELERATION

Time: 12:32

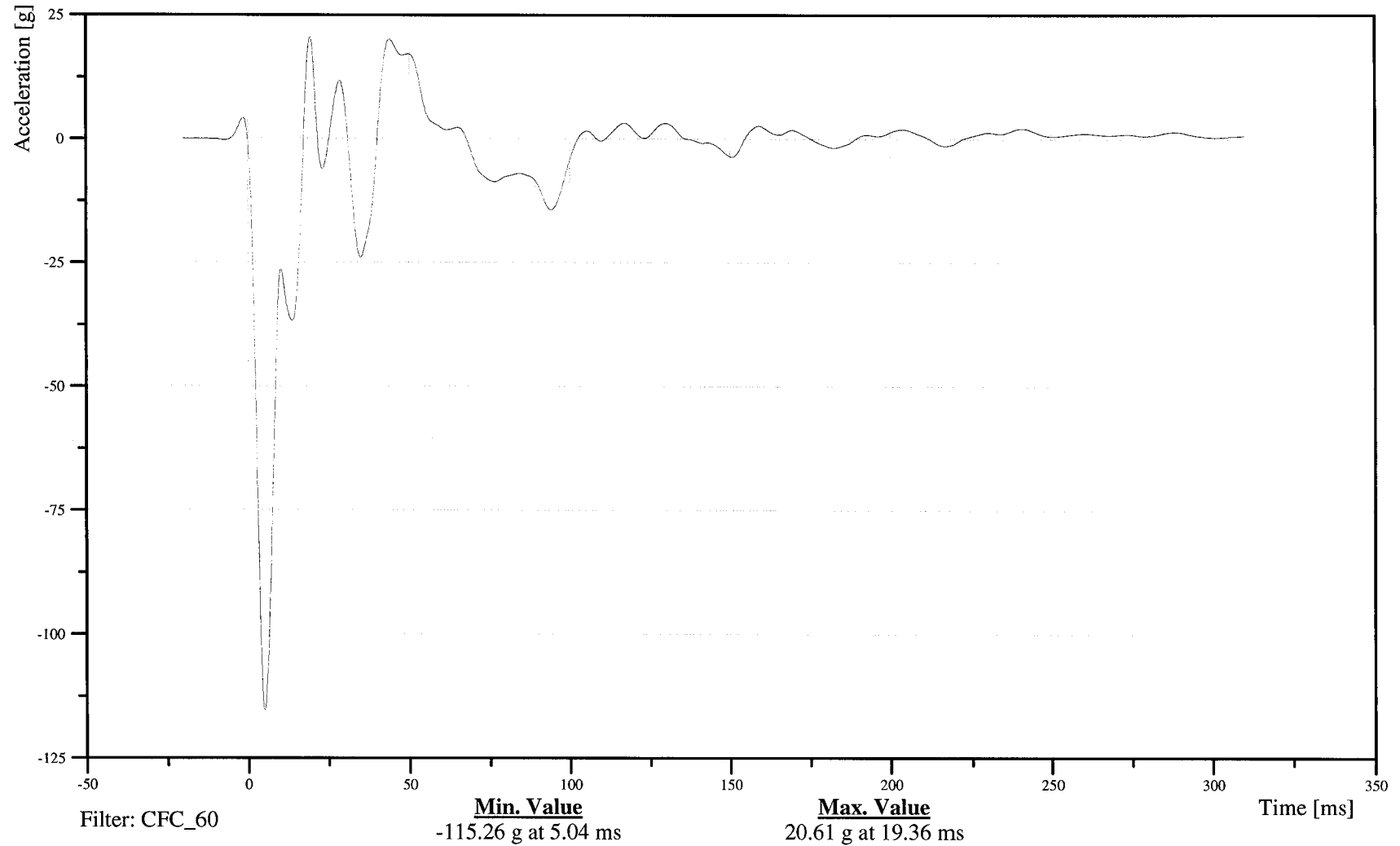
Customer: NHTSA

Test Number: C70509

16BPILMI0000ACYD

TRC Inc. Test Lab: CTF

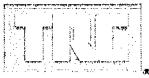
Test Number: 070323



B-75

070323





48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT MIDDLE B-POST Y-AXIS VELOCITY

Time: 12:32

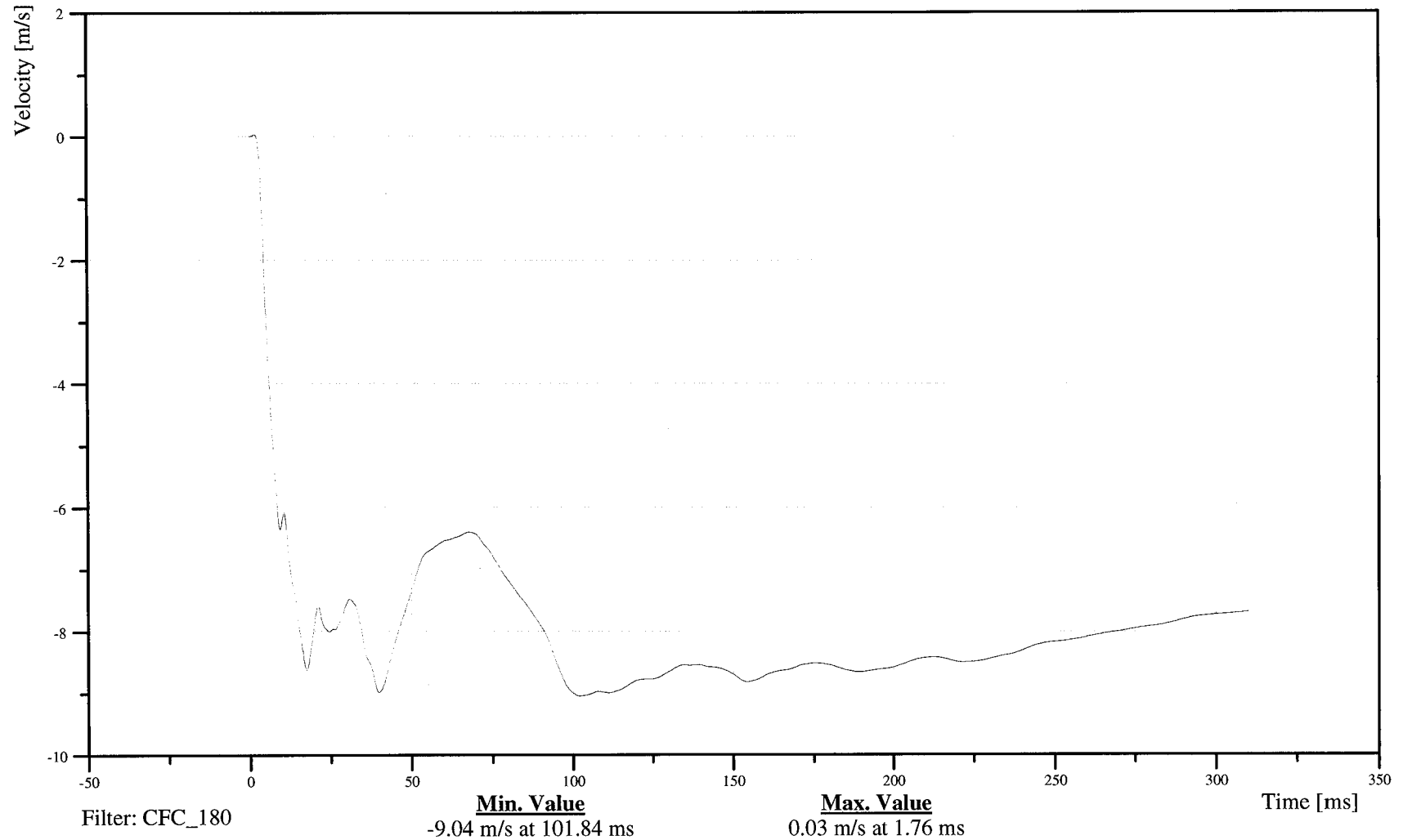
Customer: NHTSA

Test Number: C70509

16BPILMI0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-76

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT FRONT SEAT TRACK Y-AXIS ACCELERATION

Time: 12:32

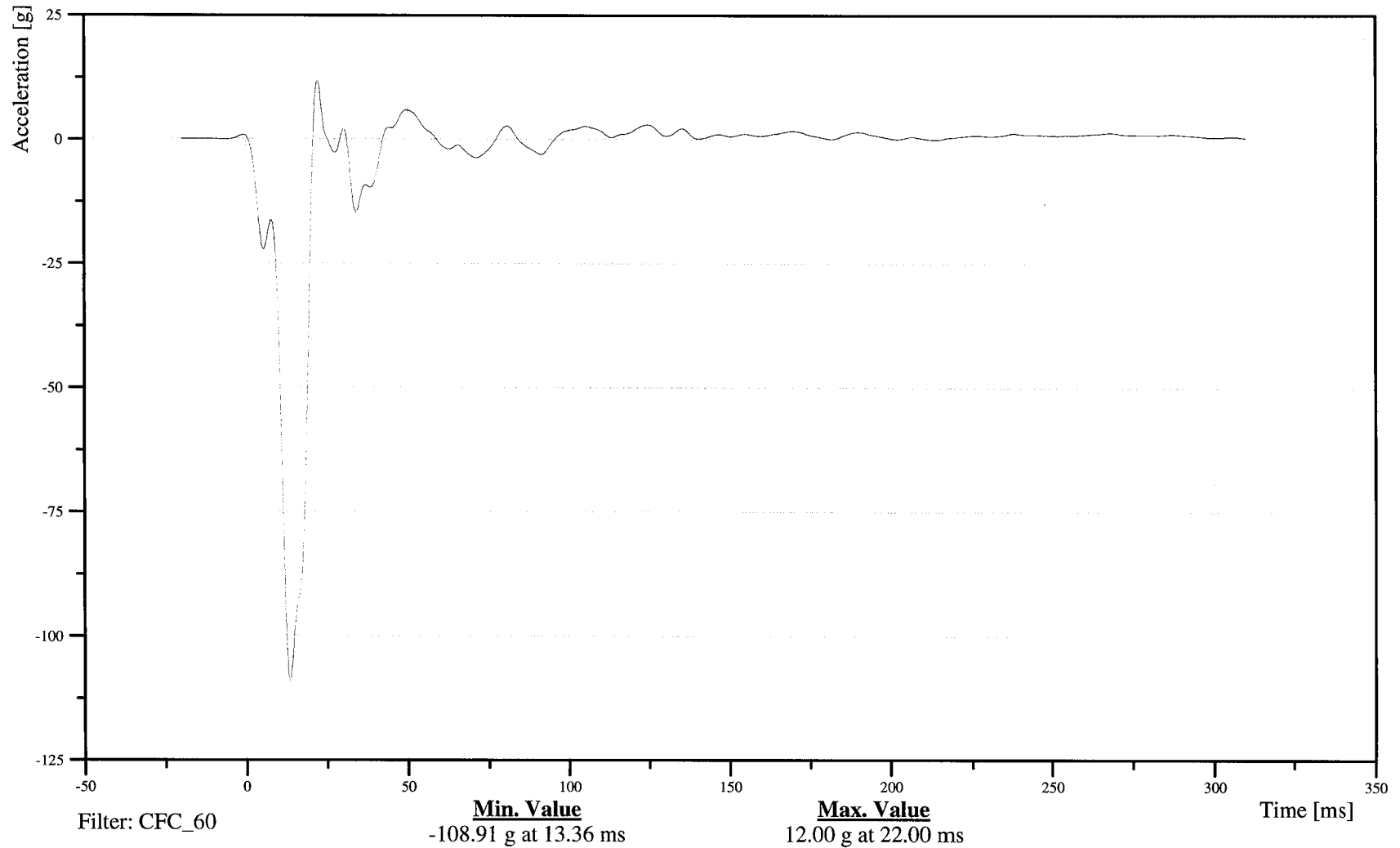
Customer: NHTSA

Test Number: C70509

13SETRFR0000ACYD

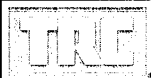
TRC Inc. Test Lab: CTF

Test Number: 070323



B-77

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

Time: 12:32

RIGHT FRONT SEAT TRACK Y-AXIS VELOCITY

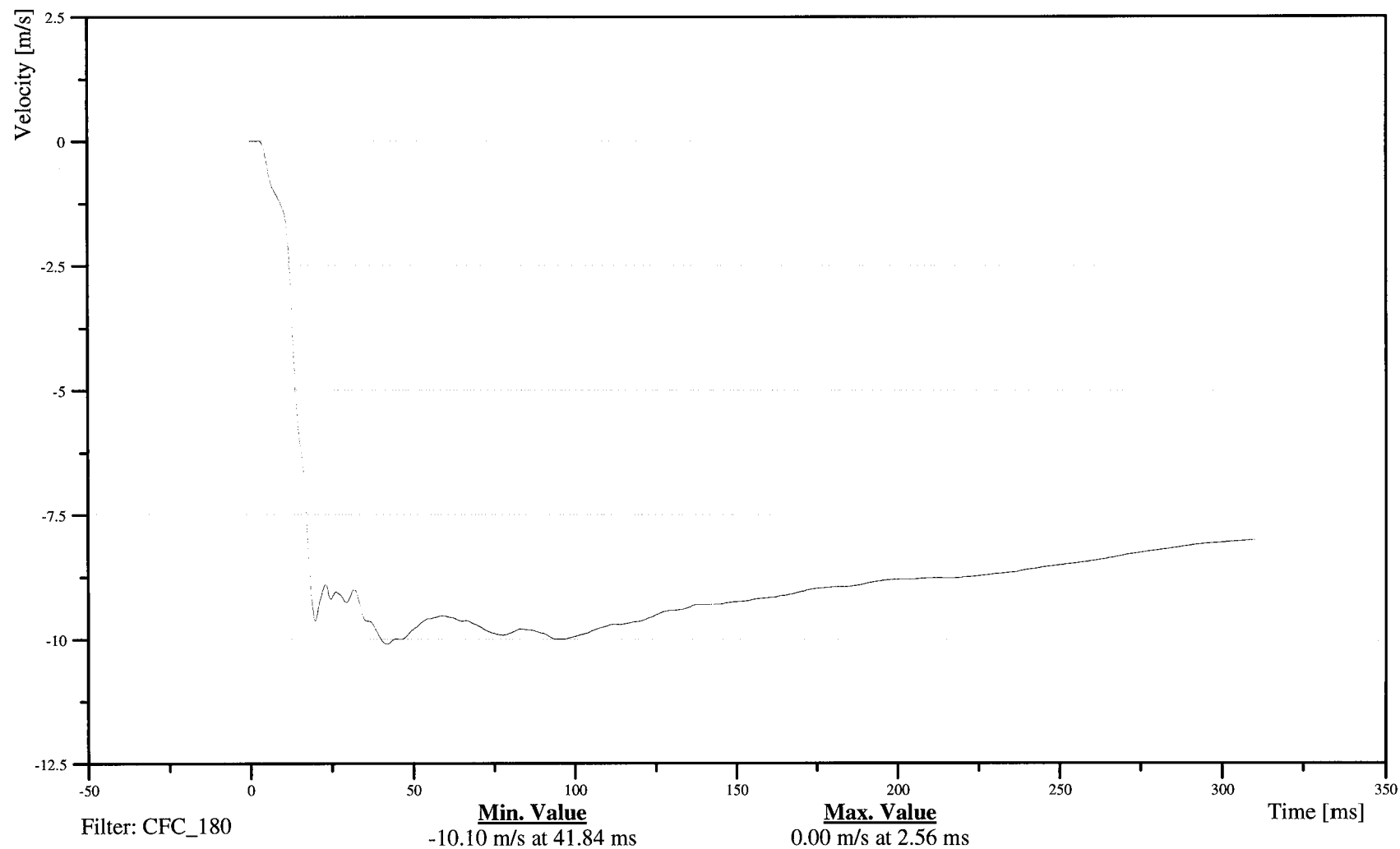
Customer: NHTSA

Test Number: C70509

13SETRFR0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-78

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT REAR SEAT TRACK Y-AXIS ACCELERATION

Time: 12:32

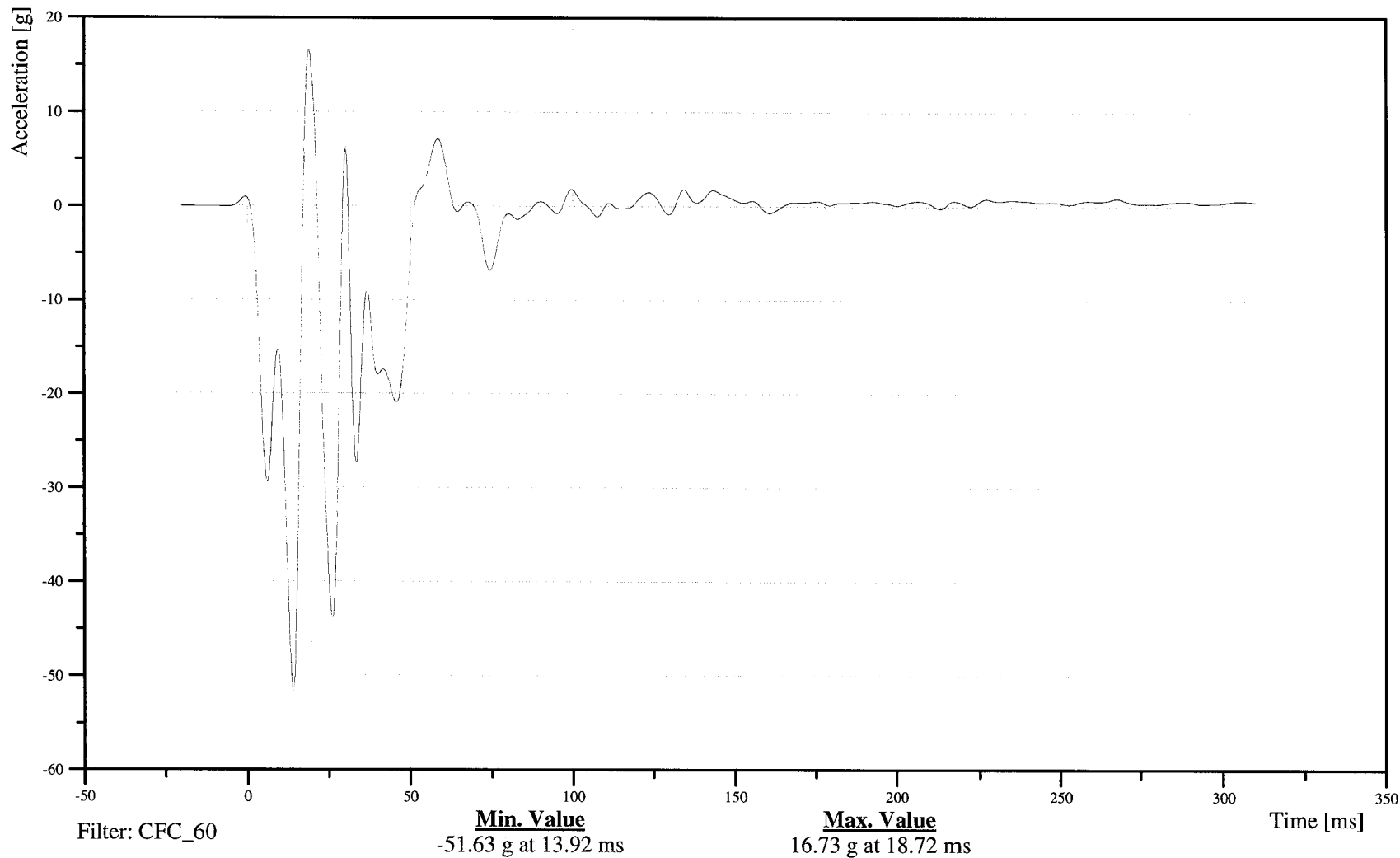
Customer: NHTSA

Test Number: C70509

16SETRLERE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-79

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

RIGHT REAR SEAT TRACK Y-AXIS VELOCITY

Time: 12:32

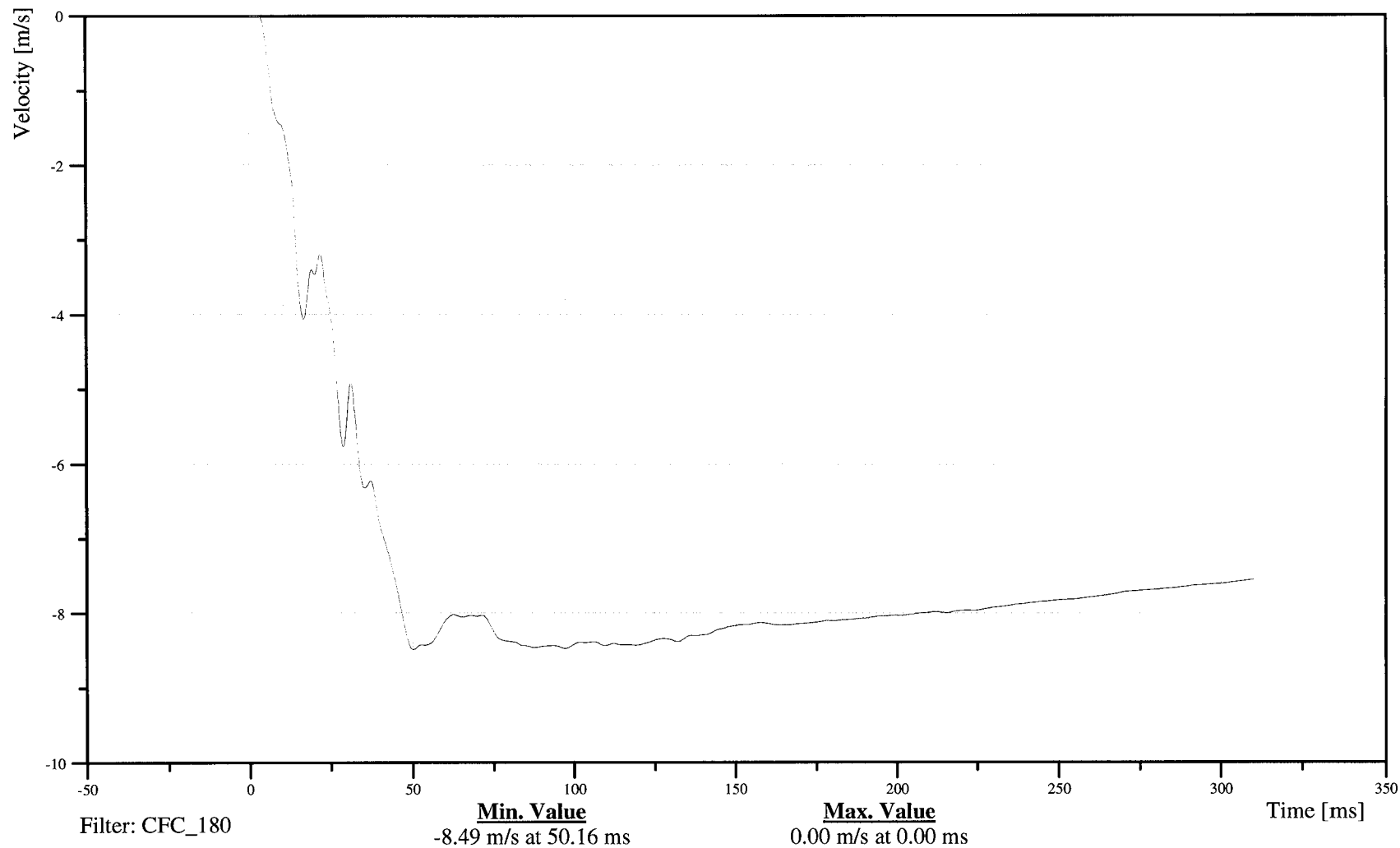
Customer: NHTSA

Test Number: C70509

16SETRLERE00VEYC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-80

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION

Time: 12:32

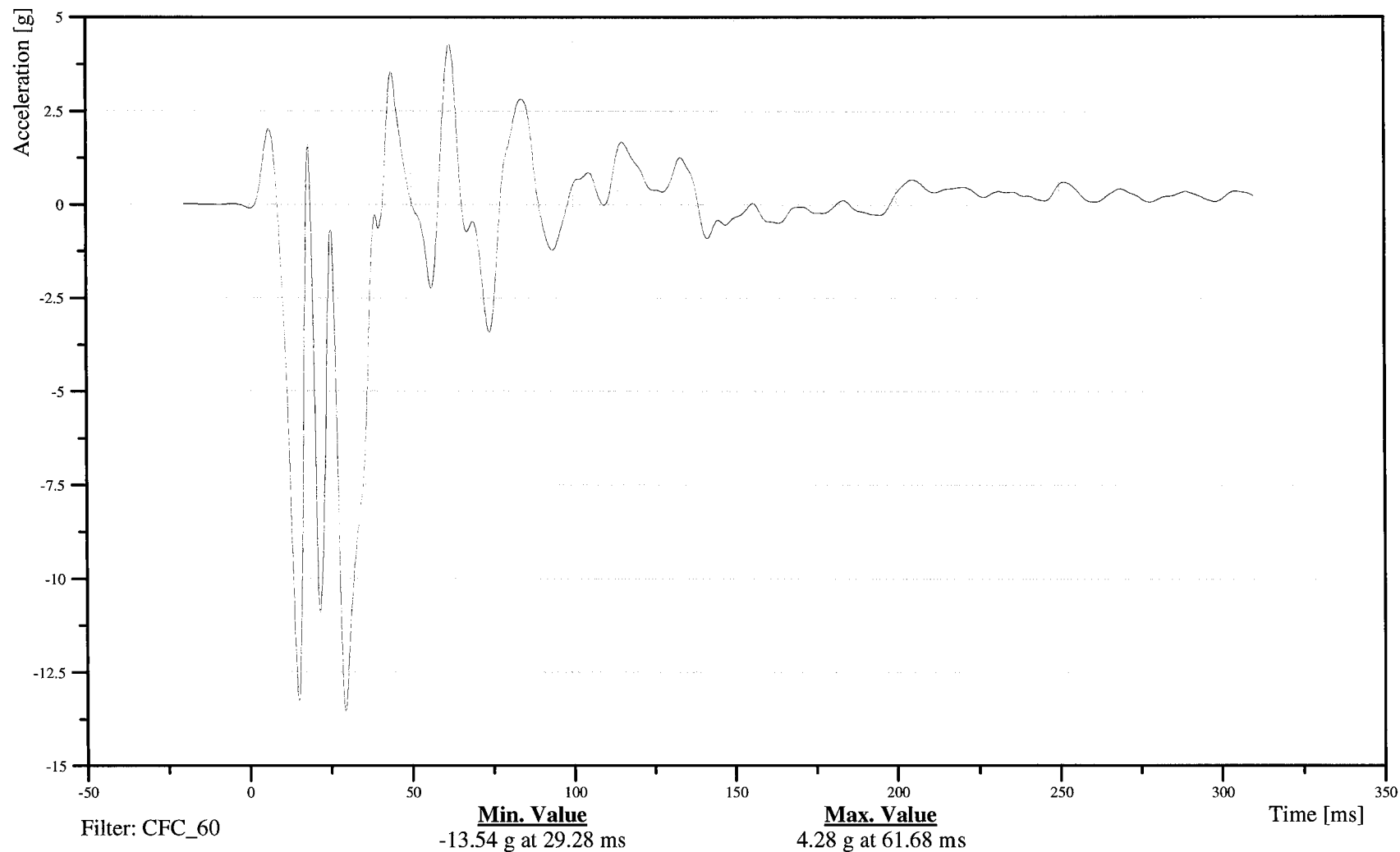
Customer: NHTSA

Test Number: C70509

10VEHCCG0000ACXD

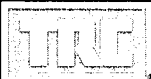
TRC Inc. Test Lab: CTF

Test Number: 070323



B-81

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

VEHICLE CENTER OF GRAVITY X-AXIS VELOCITY

Time: 12:32

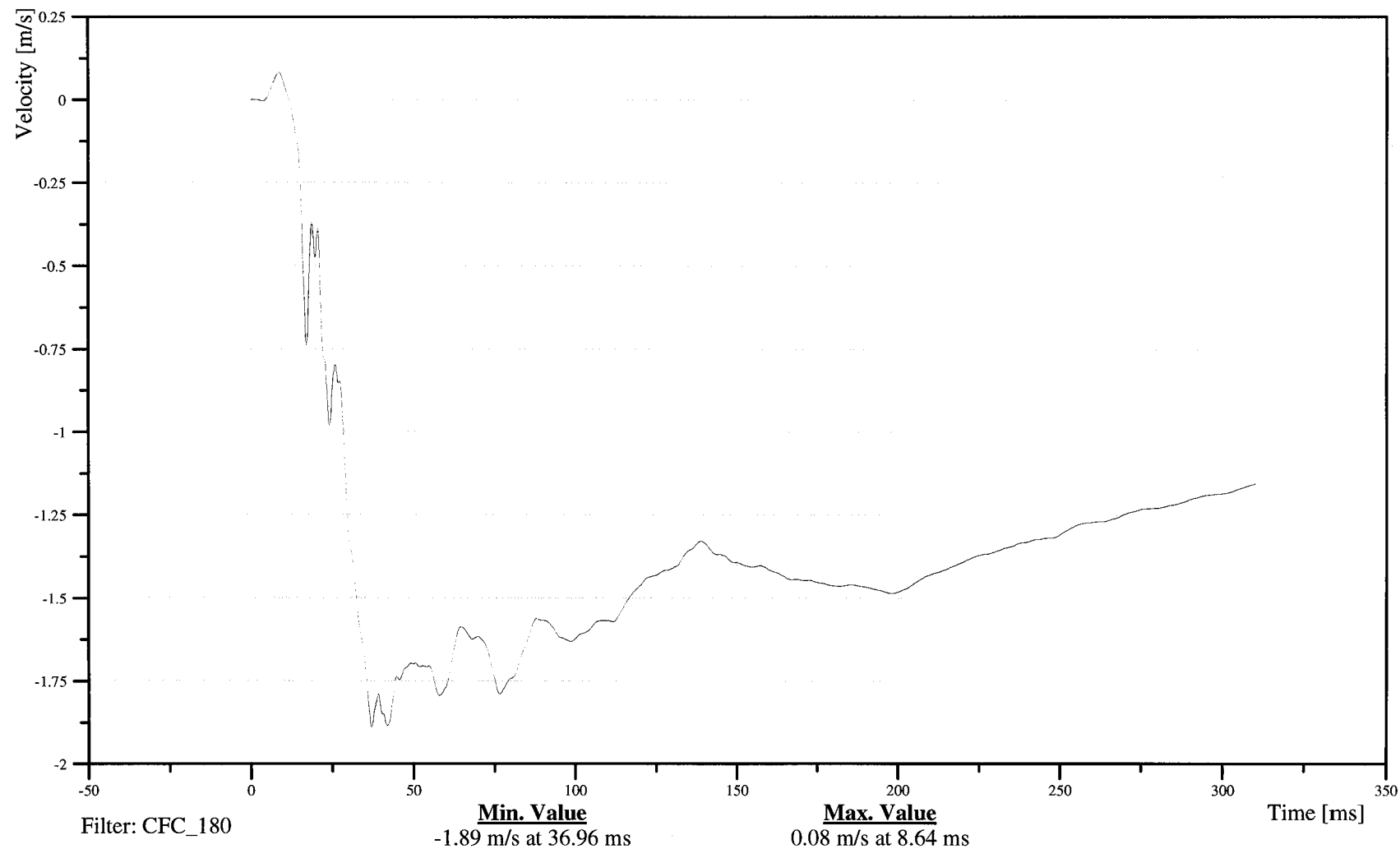
Customer: NHTSA

Test Number: C70509

10VEHCCG0000VEXC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-82

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

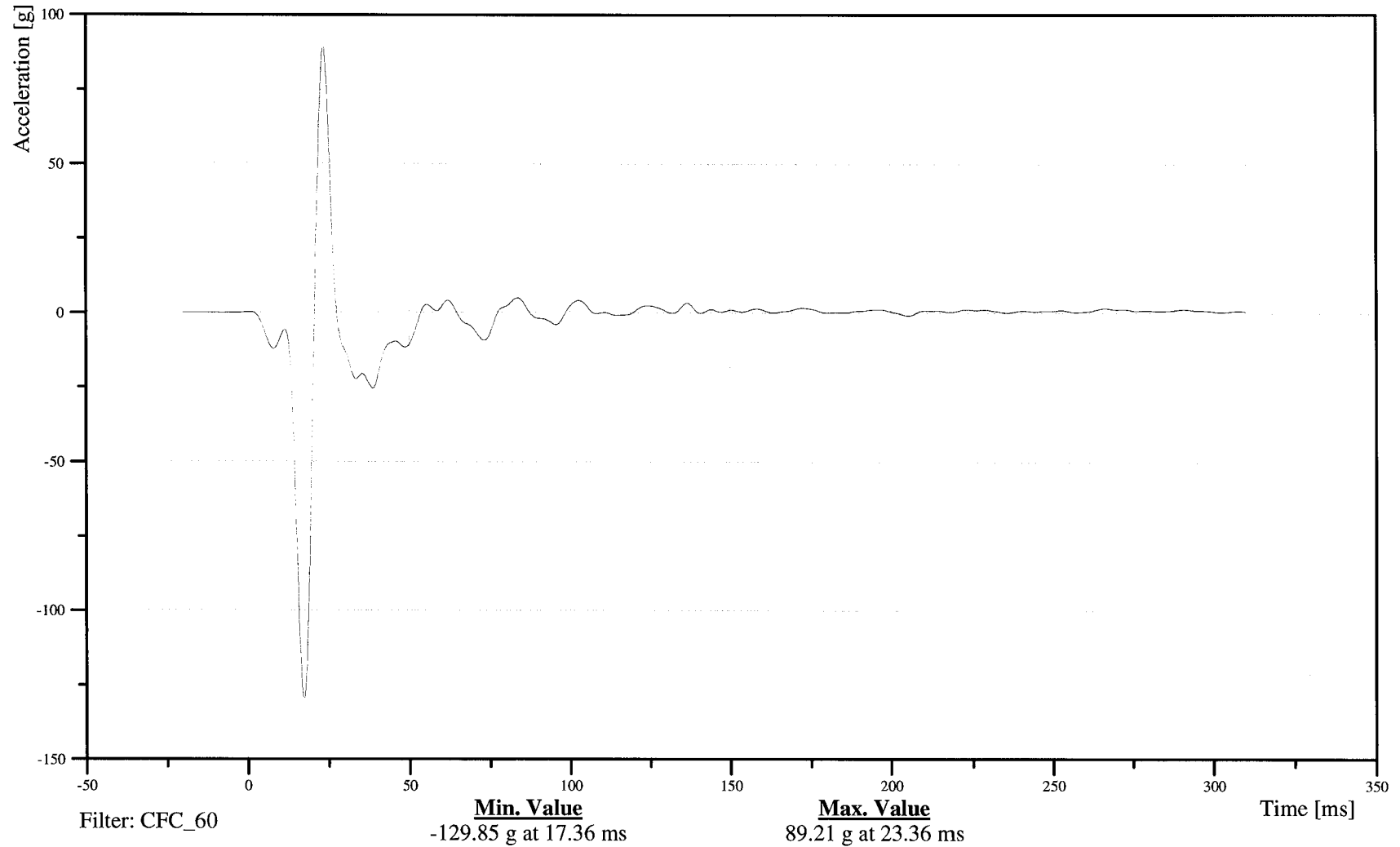
VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION

Time: 12:32

Customer: NHTSA  
Test Number: C70509

10VEHCCG0000ACYD

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-83

070323





# 48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

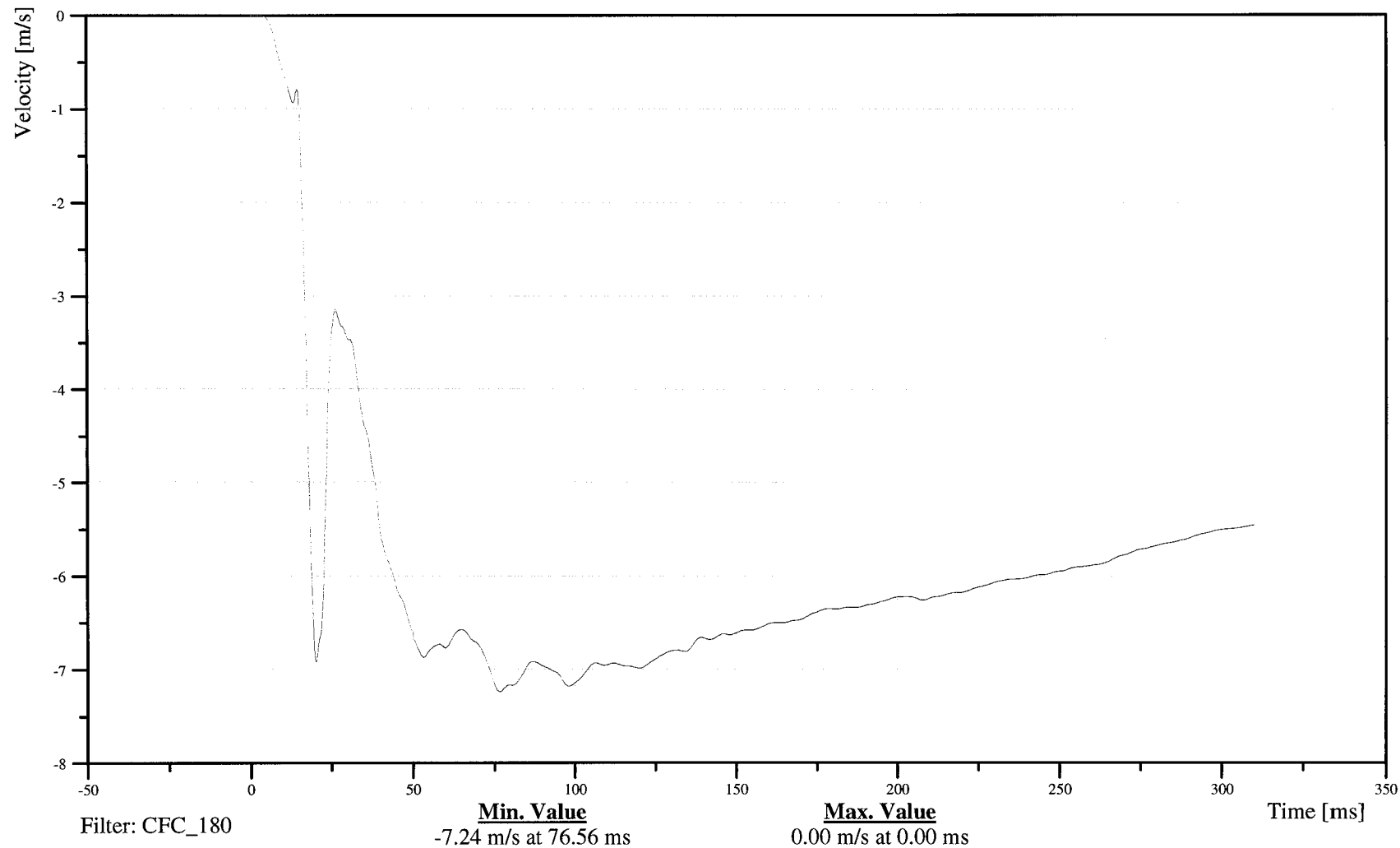
Date: 03/23/2007  
Time: 12:32

## VEHICLE CENTER OF GRAVITY Y-AXIS VELOCITY

Customer: NHTSA  
Test Number: C70509

### 10VEHCCG0000VEYC

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-84

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

Time: 12:32

VEHICLE CENTER OF GRAVITY Z-AXIS ACCELERATION

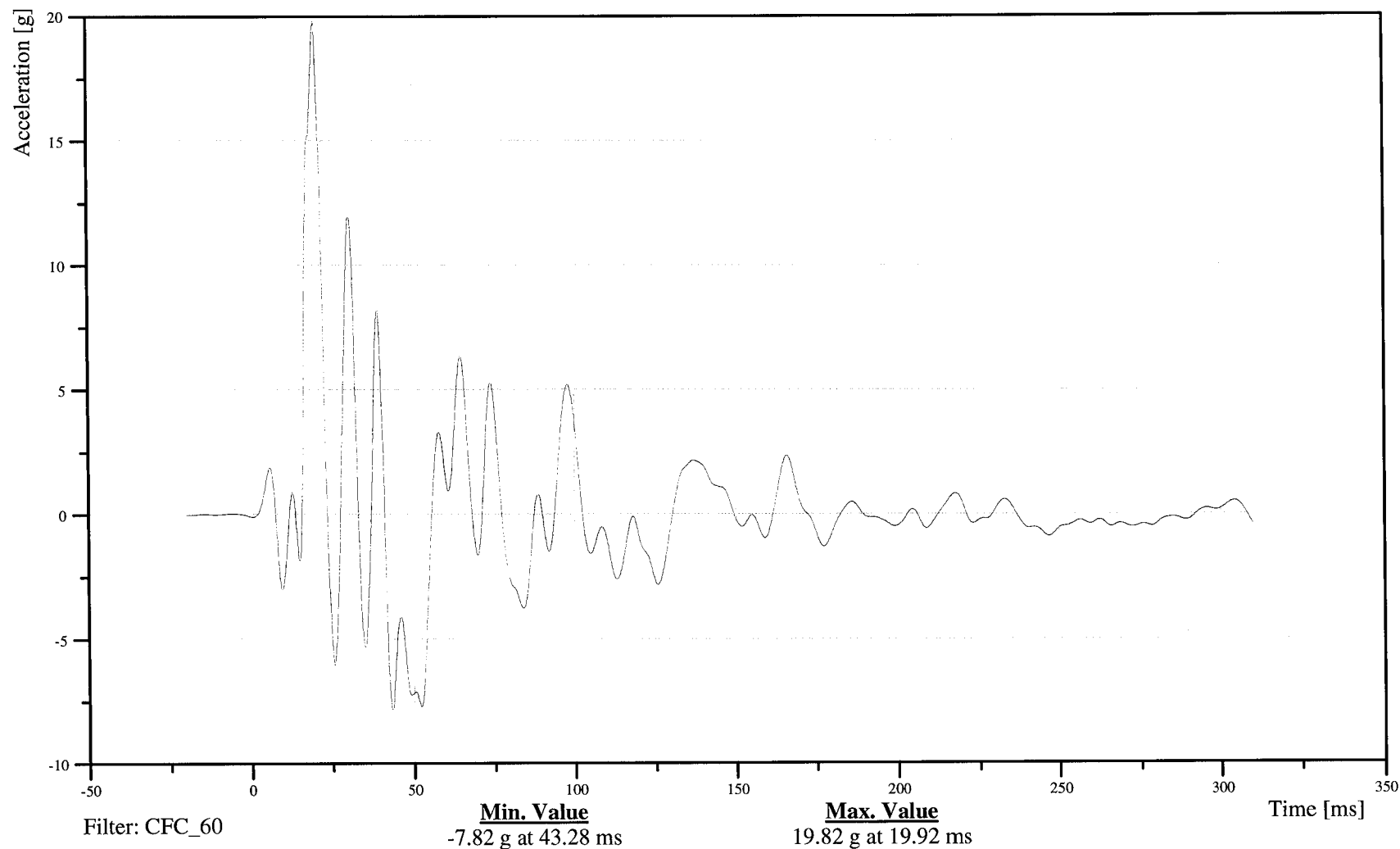
Customer: NHTSA

Test Number: C70509

10VEHCCG0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-85

070323



# 48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

## VEHICLE CENTER OF GRAVITY Z-AXIS VELOCITY

Time: 12:32

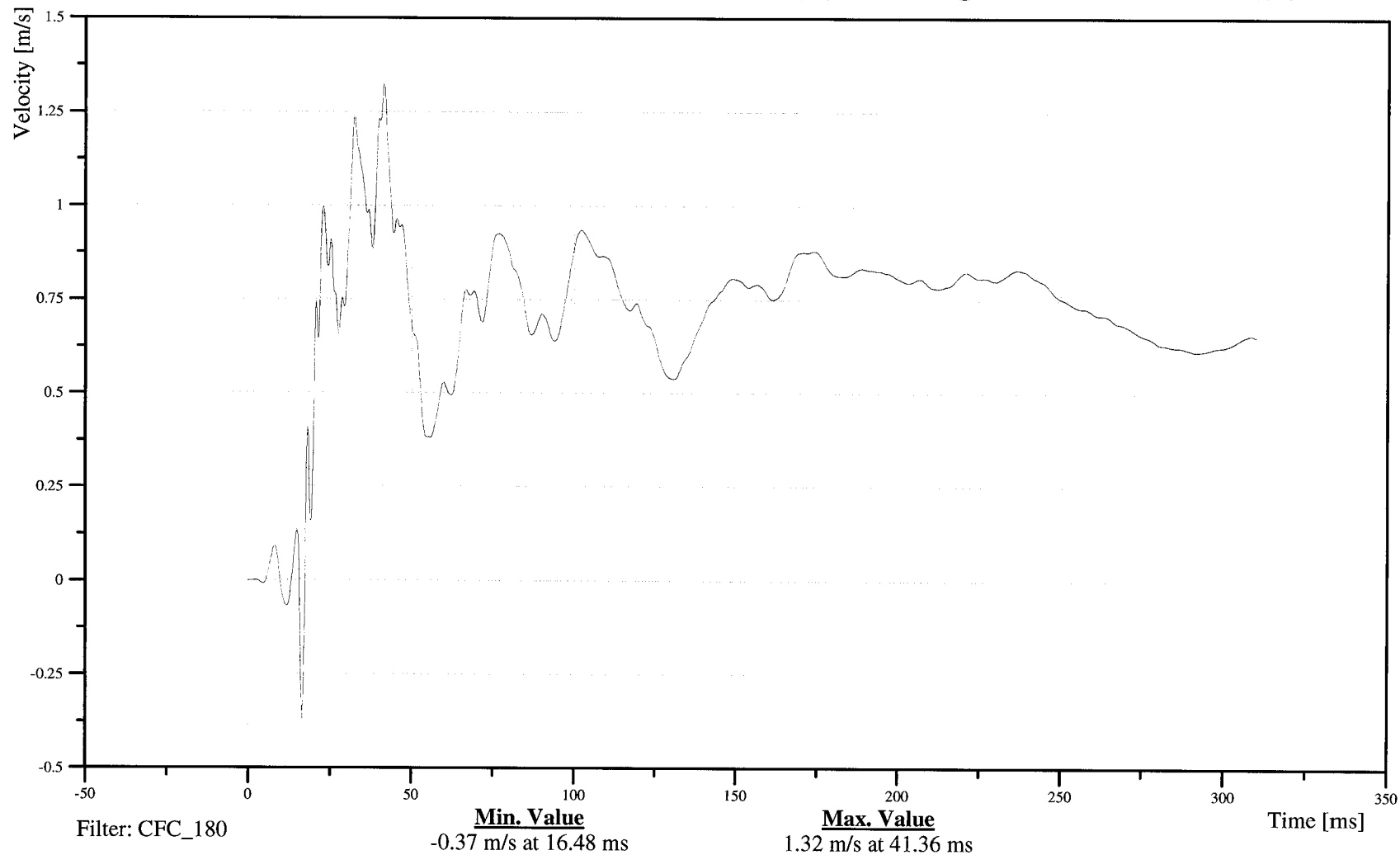
Customer: NHTSA

Test Number: C70509

### 10VEHCCG0000VEZC

TRC Inc. Test Lab: CTF

Test Number: 070323



B-86

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION

Time: 12:32

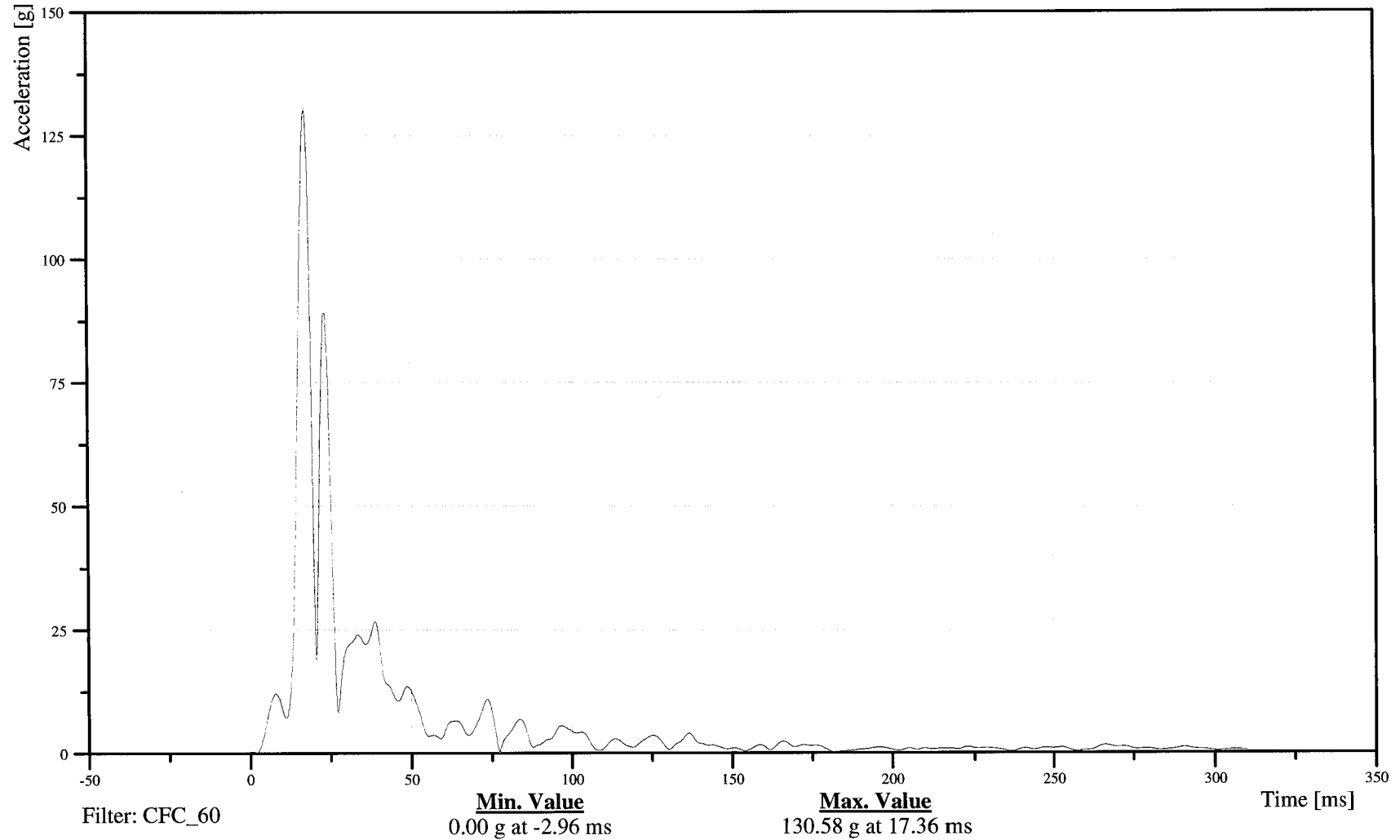
Customer: NHTSA

Test Number: C70509

10VEHCCG0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-87

070323

## MDB Instrumentation Plots



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

MDB CENTER OF GRAVITY X-AXIS ACCELERATION

Time: 12:32

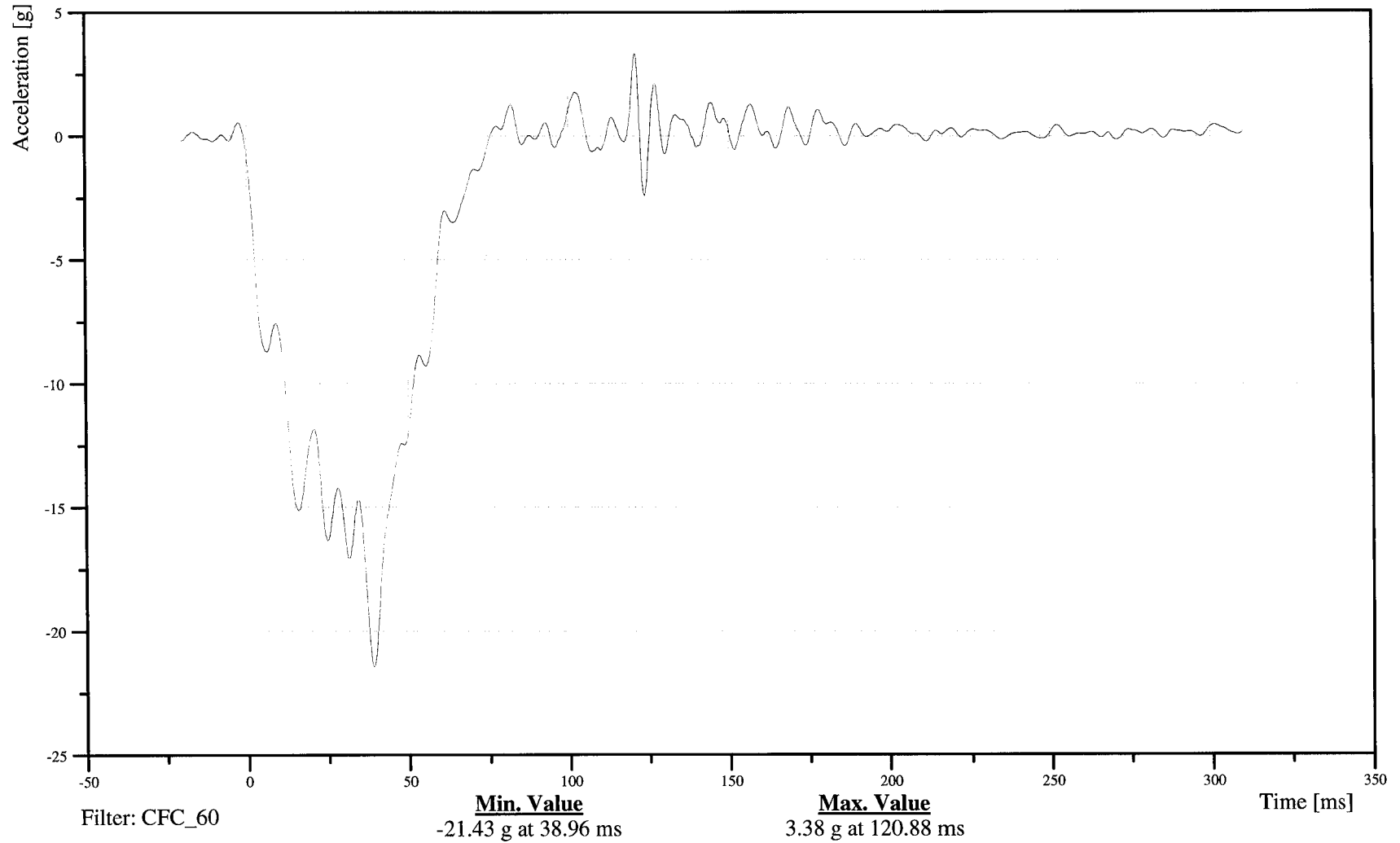
Customer: NHTSA

Test Number: C70509

M0VEHCCG0000ACXD

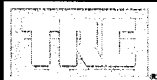
TRC Inc. Test Lab: CTF

Test Number: 070323



B-89

070323



# 48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

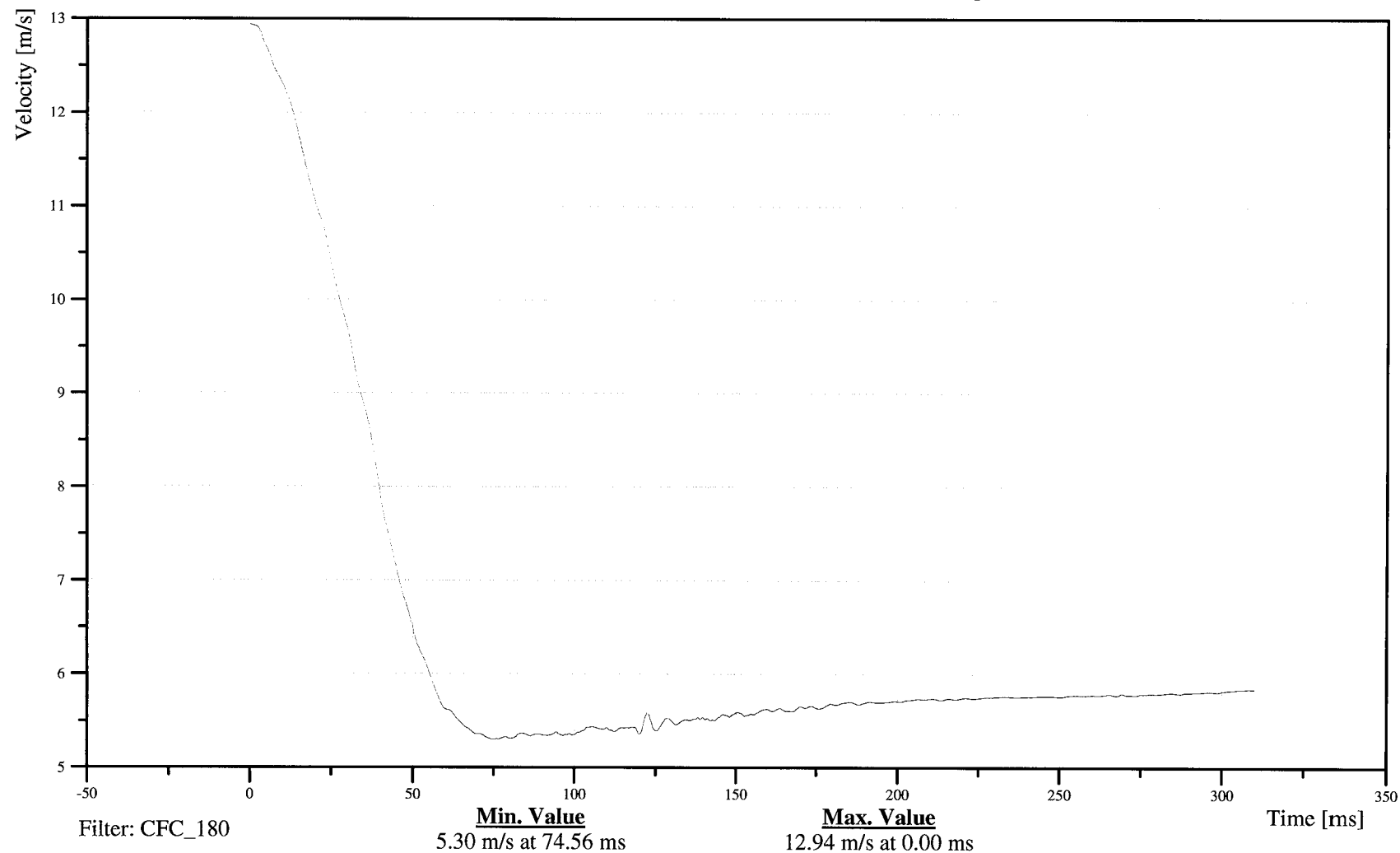
Date: 03/23/2007  
Time: 12:32

## MDB CENTER OF GRAVITY X-AXIS VELOCITY

Customer: NHTSA  
Test Number: C70509

# M0VEHCCG0000VEXC

TRC Inc. Test Lab: CTF  
Test Number: 070323



B-90

070323



48/24 kph 90 Degree Side Impact (MDB) into Right Side of 2007 Kia Rio

Date: 03/23/2007

MDB CENTER OF GRAVITY Y-AXIS ACCELERATION

Time: 12:32

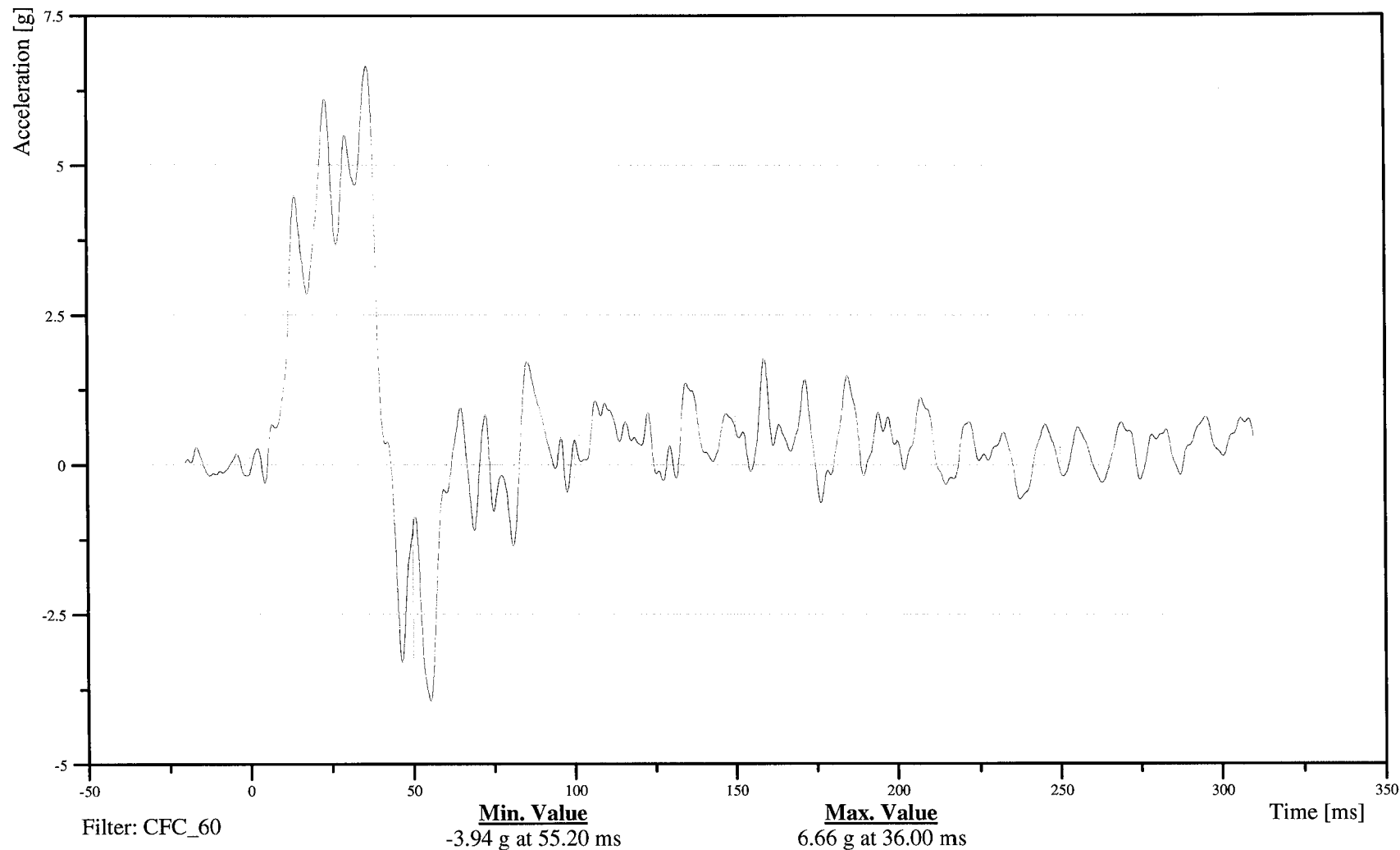
Customer: NHTSA

Test Number: C70509

M0VEHCCG0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070323



B-91

070323